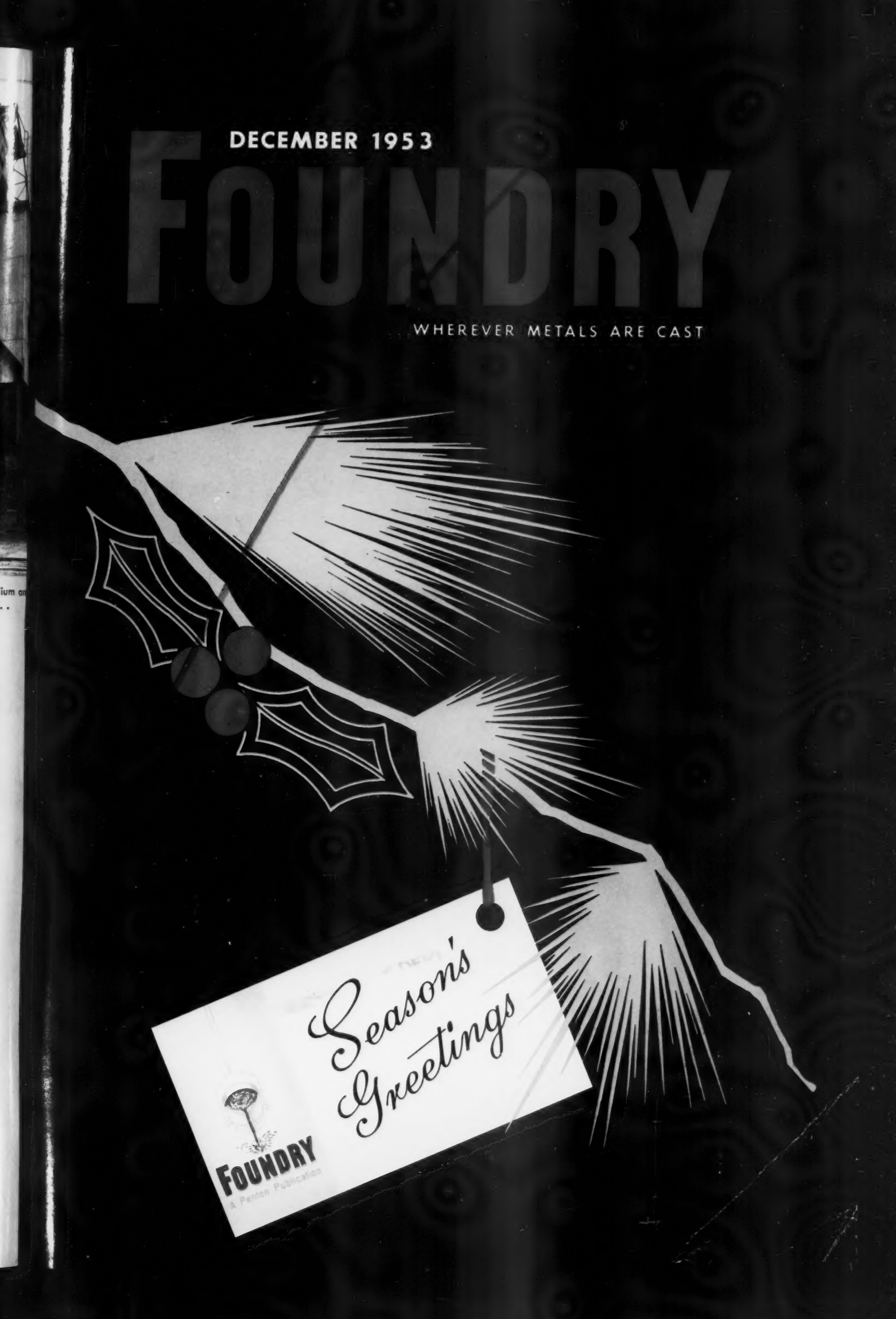
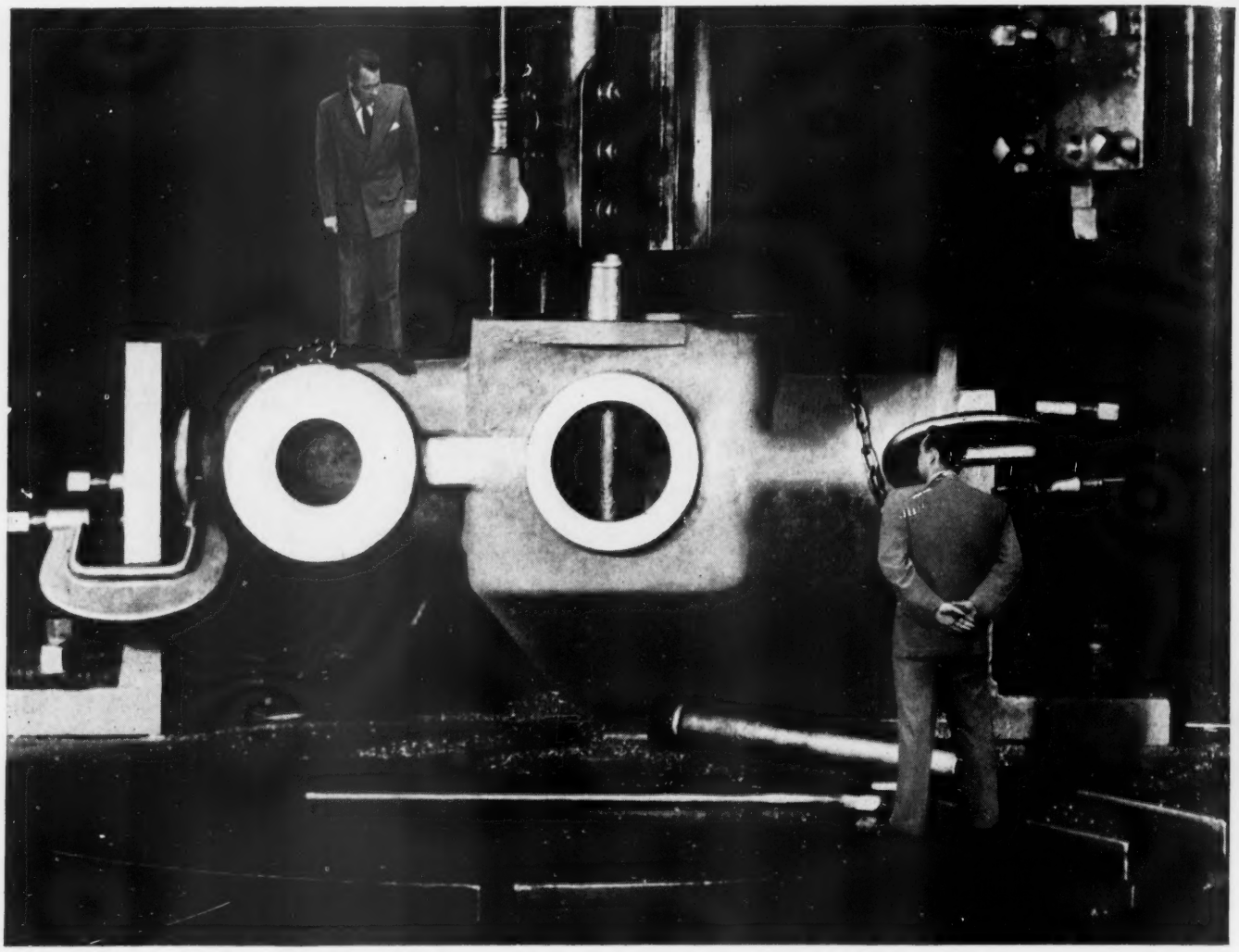
DECEMBER 1953

FOUNDRY

WHEREVER METALS ARE CAST





600 LEADING FOUNDRIES TESTIFY:

Your castings customer can MACHINE MORE CASTINGS PER TOOL

This "Tell-All" Booklet is FREE!

Write Dept. AF 84-33 at Niagara Falls for your copy, or call the FERROCARBO Distributor nearest you.

FERROCARBO DISTRIBUTORS:

KERCHNER, MARSHALL & CO.
PITTSBURGH • Cleveland • Buffalo
Philadelphia • Birmingham • Los Angeles

MILLER & COMPANY
CHICAGO • St. Louis • Cincinnati

WILLIAMS & WILSON
TORONTO • Montreal • Windsor

Your customer wants castings that are easy to machine. When *you* deoxidize your gray iron with FERROCARBO in patented briquette form, *he* can machine up to 35% more castings per tool, before resharpening. You can better guarantee him castings that are clean, sound, free of segregations and inclusions, with more resistance to wear and heat shock.

600 leading foundries are now producing *premium* castings—both gray iron and malleable—by deoxidixing with FERROCARBO patented briquettes. Are you among them?

FERROCARBO
TRADE MARK

by **CARBORUNDUM**

"Carborundum" and "Ferrocarbo" are trademarks which are registered in the U. S. by The Carborundum Company, Niagara Falls, New York, and in Canada by Canadian Carborundum Company, Ltd., Niagara Falls, Ontario

60% longer service life from Nickel iron pots

In addition to producing 80 sizes of melting pots, C. H. MILLES FOUNDRY COMPANY devotes a large portion of its production to metal ingot molds.

A service life of 100 days is good for a plain cast iron melting pot.

But C. H. MILLES FOUNDRY COMPANY of Chicago, Ill., wanted to provide even longer life in the pots they cast.

So they experimented and found that cast iron containing 1.00 to 1.25% nickel would give longer life.

In fact, a typical comparison gave a life span of 160 days for the nickel iron to 100 days for plain iron—an increase of 60%!

Melting pots and ingot molds such as are shown here are typical of the nickel cast iron parts used in elevated temperature applications. At temperatures up to 1300°F. nickel alloyed cast irons maintain a higher proportion of their room temperature strength and hardness, and show less growth and scaling, than unalloyed irons. For applications involving temperatures as high as 1500°F. the austenitic Ni-Resist® compositions are recommended.

At the present time, nickel is available for the production of nickel cast irons and other alloys containing nickel, for end uses in defense and defense supporting industries. The remainder of the supply is available for some civilian applications and governmental stockpiling.

EMBLEM OF INCO SERVICE

The International Nickel Company, Inc.
Dept. 20, 67 Wall Street, New York 5, N. Y.

Please send me booklet entitled, "Guide to the Selection of Engineering Cast Irons."

Name_____ Title_____

Company_____

Address_____

City_____ State_____

F-12-53

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

HERE'S ALL YOU NEED

These three additives will provide the precise sand characteristics needed for your work. FEDERAL GREEN BOND for desired sand strength. CROWN HILL SEACOAL for carbon content. FEDERAL SAND STABILIZER for flowability. And of the three, FEDERAL STABILIZER can be the one factor to really "balance out" your sand for better results. FEDERAL STABILIZER definitely provides better flowability so green strength can be run higher—makes for easier, more uniform ramming—allows a wider range of safe moisture content—minimizes lumpy shakeout to permit maximum sand reclamation.

HERE'S GOOD NEWS! You now have a choice of "DUSTLESS" or "regular" CROWN HILL SEACOAL and FEDERAL PITCH BINDERS. The new "dustless" type is chemically treated to minimize dustiness in handling. This treatment in no way affects the performance of any sand additives. The difference is in handling—working conditions are greatly improved through the reduction of skin irritation and dust inhalation. The slight additional cost is more than offset by more healthful working conditions, better "housekeeping" and the elimination of losses in air-swept mixing and handling equipment. Ask your FEDERAL representative to show you the convincing demonstration of "dustless" additives.

Make your foundry a better place in which to work!

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND, VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON, WYO.

IN TWIN CITIES: C. D. Gallaher Company, 428 Stinson Blvd., Minneapolis

FOUNDRY

Volume 81—Number 12

DECEMBER 1953

Editorial 101

SPECIAL ARTICLES

How To Avoid Trouble in the Aluminum Foundry 102
Some of the most common defects and their causes are described and suggestions made for their elimination—By DONALD L. LAVELLE

Solidification of Bronze 107
This is a discussion of the relation between temperature, rate of pouring and solidification of bronze—By HAROLD J. ROAST

Annealing or Softening Improves Gray Iron Machinability 108
The process, its advantages and limitations plus recommendations for procedure are described—By CHARLES O. BURGESS

Army Engineers Operate Mobile Foundry 112
Equipment for a mobile foundry unit and the training of personnel to operate it in the field are discussed—By FRANK G. STEINEBACH

Use of Shell Cores in Casting Air-Cooled Engines 114
Two typical production jobs illustrate the use and methods of producing shell-molded cores—By JOHN L. SCHMIEDER JR.

Foremen's Problems and How To Avoid Them 118
Complaints are described, proper approach to the problem outlined, and solution and preventive measures offered—By ARTHUR C. CROFT

Statistical Quality Control 120
Here is a way to help workmen regain pride in their craftsmanship through humanized statistics—By A. J. KUKLA

International Foundry Congress 125
Presented here are digests of papers read and discussed at the technical sessions of the Paris congress—By VINCENT DELPORT

Heat Treatment of Steel Castings (Part III) 126
Use of the Jominy test to develop a hardenability curve for quenched steel is covered—By JOHN HOWE HALL

National Malleable Opens New Technical Center 152

Pushbutton Foundry Is Approached By ROBERT H. HERRMANN 154

Man-to-Man By RALPH L. LEE 168

Many Foundries Exhibit Wares at Metal Show 181

Installs Modern Core Baking System 184

MEETINGS

Foundry Equipment Manufacturers Association 144

Michigan Regional 162

Purdue Metals Casting 190

New England Regional 220

NEWS FEATURES

Around the Country	176	**Late Foundry News**	33
Calendar of Meetings	147	**Men of Industry**	136
Foundry Group Activities	206	**News Views**	150
Industry Briefs	172	**Obituary**	170

REGULAR DEPARTMENTS

ABC of Foundry Practice	203	**Ideas for Foundrymen**	233
Adventures of Bill By Pat Dwyer	196	**New Equipment and Supplies**	230
Classified Advertising	287	**Questions and Answers**	130
Data Sheet	187	**Readers' Comment**	96
Dear Reader	295	**Statistics**	159
Foundry Developments	167	**Trade Publications**	268
How To Do It	156	**With the Editors**	10

Business Staff—page 294 **Advertisers' Index—page 294**

EDITORIAL STAFF

FRANK G. STEINEBACH
Editor

WILLIAM G. GUDE
Managing Editor

EDWIN BREMER
Metallurgical Editor

PAT DWYER
Engineering Editor

ROBERT H. HERRMANN
Associate Editor

JACK C. MISKE
Assistant Editor

VIRGINIA C. TAYLOR
Assistant Editor

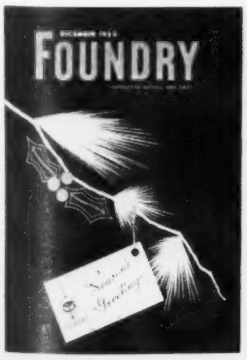
VIRGINIA B. HARMS
Assistant Editor

DON S. CADOT
Art Editor

New York ..... B. K. PRICE
L. E. BROWNE, SAMUEL W. BAKER
Detroit .... FLOYD G. LAWRENCE
Chicago ..... ERLE F. ROSS
Pittsburgh ... ROBERT M. LOVE
Washington... E. C. KREUTZBERG
London ..... VINCENT DELPORT

ADVISORY STAFF

JOHN W. BOLTON
ALBERT E. GROVER
HARRY A. SCHWARTZ
BERNARD P. MULCAHY



THE COVER: A sprig of the yule tree, holly leaves and berry, best wishes to all for a season that's merry
RHH

Published monthly by the Penton Publishing Co., Penton Building, Cleveland 13, O. Subscriptions in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $5; two years $8. Other foreign countries, one year $10. Single copies 75 cents. Copies published three or more months previous to date of current issue $1. Entered as second class matter at the postoffice, Cleveland, O., under the act of Mar. 3, 1879.

Copyright, 1953, by the Penton Publishing Co.

WATERBURY FARREL FOUNDRY... solves t

with

ARCHER DANIELS MIDLAND COMPANY

FOUNDRY PRODUCTS DIVISION • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

ves the problem of KING-SIZE cores...

INDUCTOL

the pre-baked core oil

Huge machinery tool castings weighing from five to twenty-five tons are an everyday occurrence at Waterbury Farrel Foundry & Machine Company, Waterbury, Connecticut.

A large part of the core work involves massive chunks and intricate shapes. Cores have to be strong before and after baking. They have to bake out fast and thorough with no green centers. Furthermore, smaller cores in the same oven cycle must be protected from overbaking.

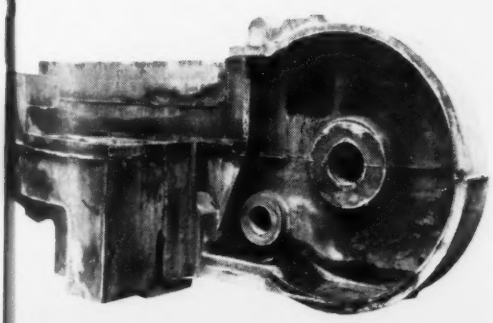
These are a few of the many reasons why Waterbury Farrel uses INDUCTOL in their core mix. In addition they gain the benefits of easy mixing and excellent workability. INDUCTOL, too, forms noticeably less gas than conventional core oils, and it is non-toxic.

Perhaps INDUCTOL can answer some of your core-making problems. Write for details and samples, or call your LINOIL man.

The 102-year-old Waterbury Farrel Foundry produces castings for use in their line of metal-working machines. Castings weigh from ¼ pound to 25 tons. One of the smallest cast parts is displayed here against the background of a 16-ton frame for a nut forming machine.

Snagging rough casting of a 5½-ton frame for a cam eyelet machine.

It takes 2½ days to complete this 6-ton grey iron casting, the frame for a Waterbury Farrel screw thread roller.



write for details on the **ADM** line of foundry products:

LINOIL	INDUCTOL	LIN-O-CEL	FRE-FLO	ADMIREZ
CORE OIL	FAST-BAKING CORE OIL	SAND STABILIZER	PARTING COMPOUND	FOUNDRY RESIN

THER-MONIC ELECTRONIC CORE BAKERS

THER-MONIC
INDUCTION HEATING CORPORATION
INCOMPARABLE NEW FEATURES!
• 40" Wide Electrode and Belt!
This new width (the field's widest) permits greater production at slower belt speeds for easier loading. Output of small cores can now be increased 25%.
• Oscillator & Power Supply now completely enclosed under "positive pressure"!*
Dust and dirt cannot enter! THER-MONIC core bakers are guaranteed to give heavy duty, trouble-free service. From top-to-toe . . . from end-to-end . . . component-by-component, these are the industry's best.
WE WELCOME the opportunity to discuss and demonstrate THER-MONIC core baking equipment suitable for your particular requirements.
*Meets J.I.C. specifications

FIRST and FINEST in the FOUNDRY INDUSTRY!

INCOMPARABLE PERFORMANCE RECORD!

The electronic core baking process . . . first introduced in 1945 by Induction Heating Corporation, largest producers of electronic heat treaters . . . has won, in a relatively short space of time, an important place for itself in the core rooms of the greatest number of those foundries which have already installed electronic core baking equipment.

Since the introduction of the first Ther-monic laboratory core baker . . . we have developed, in close collaboration with interested foundries, the type of rugged equipment best suited for the industry's particular needs. A recent survey of two thousand Ther-monic installations in all fields, revealed the amazing fact that our service division has only averaged one call in 1.6 years per unit.

Ther-monic core baking equipment is now available with hourly capacities of 500 lbs., 1000 lbs., 2000 lbs., 4000 lbs. and 8000 lbs. One of our field engineers will be glad to personally survey your core baking requirements. Write today!

SPECIFICATION SHEETS
Yours for the asking . . .
Write for new, illustrated specification sheets. Study and compare the many exclusive features incorporated therein.

INDUCTION HEATING CORPORATION
181 WYTHE AVENUE • BROOKLYN 11, NEW YORK
Largest Producers of Electronic Heat Treating Equipment

(Advertisement)

A Report from Vanadium Corporation

How Vanadium Corporation's long-range expansion program is helping industry.

CHROMIUM ALLOYS

Vanadium Corporation's new plant at Graham, West Virginia, has been especially equipped to produce—by a unique new process—a remarkably clean, dense new *low carbon ferrochromium*. This new alloy combines a normal silicon content with a high chromium-to-carbon ratio which enables the steelmaker to produce stainless steels of extremely low carbon content without resorting to modification of furnace and melting practices.

The new Graham plant also produces various alloys of *ferrochrome-silicon*. Additional modern facilities at Niagara Falls are producing increased quantities of *high-carbon ferrochromium* by Vanadium's exclusive process. There is an ever growing demand for these clean, high-density Vancoram Alloys—particularly in the many applications where quality and economy are primary considerations.

GRAINAL ALLOYS

These are the multiple-element alloys developed by Vanadium Corporation that are now being used to produce annually over *a million tons of boron steels*. Replacing critical and more costly elements with respect to hardenability and other properties, Grainal Alloys have proved invaluable not only in times of heavy defense production but also in providing low-cost, high-quality alloy steels for our peacetime economy.

New use for Grainal Alloys: alleviating the problem of hot shortness in *stainless steels*. Field reports indicate that small additions of Grainal improve the hot working characteristics of stainless, thus cutting conditioning costs and increasing output.

Anticipating the future demand for Grainal Alloys, Vanadium Corporation has included at its new plant at Cambridge, Ohio, additional facilities for their production.

VANADIUM ALLOYS

With government restrictions on the use of vanadium now lifted, steelmakers can once again take full advantage of Vancoram *ferrovanadium*. Small additions of this versatile, economical alloy often do the work of large amounts of other, more expensive alloys—*a little goes a long way*.

Vanadium Corporation has played an important role in helping to make vanadium again available in large commercial quantities.

For example . . .

New VCA mines in Colorado have substantially increased the production of *vanadium ore* in conjunction with western uranium operations.

Complete new facilities at the Cambridge, Ohio, plant will soon be in full operation to further insure a plentiful supply of highest quality ferrovanadium for every application—from watch springs to giant forgings.

More news about Vancoram Ferrovanadium: Available for many years both in bags and drums, ferrovanadium can now be furnished palletized for greater shipping economy and ease of handling.

SILICON METAL AND ALLOYS

Among the promising new nonmetallic materials developed during World War II are the Silicone plastics. Their outstanding properties include resistance to both high and low temperatures—thanks to *silicon metal* used in their manufacture.

Vanadium Corporation's new Graham plant provides the plastics industry with a dependable new source of silicon metal of highest quality.

The new Graham plant is also furnishing a complete range of silicon metal and *ferrosilicon* to the aluminum, iron, steel, magnesium and other industries.

RESEARCH

Now nearing completion at the Cambridge plant is the new enlarged Research Center. This new center contains extensive, modern facilities for the further development of all Vancoram products—which also include, *titanium alloys, master aluminum alloys*, and a complete range of *foundry alloys* for every application.

VANADIUM CORPORATION OF AMERICA

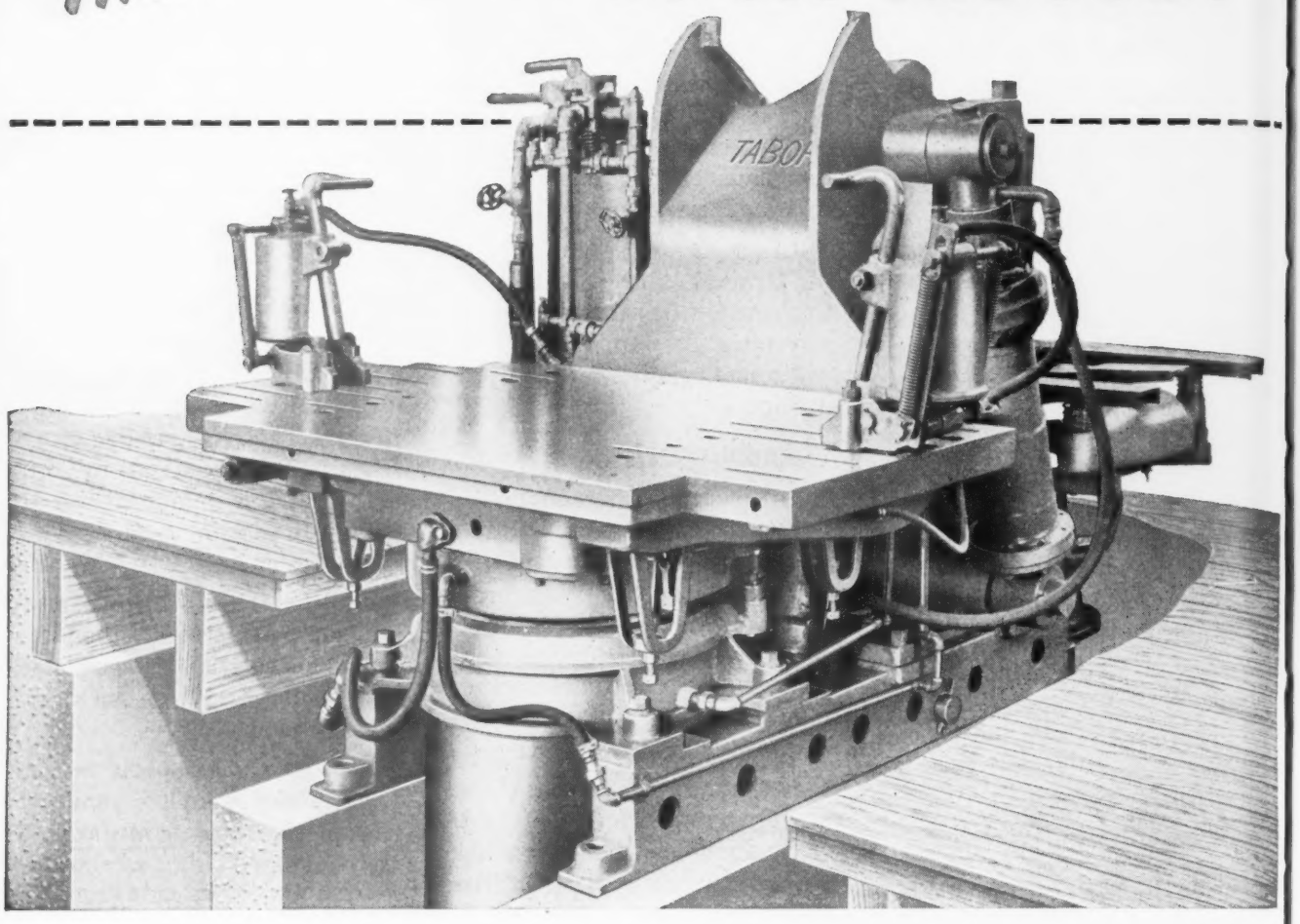
420 Lexington Avenue, New York 17, N. Y.

Producers of alloys VANCORAM metals and chemicals

PITTSBURGH • CHICAGO • DETROIT • CLEVELAND

PLANTS: Niagara Falls, N. Y., Graham, W. Va. Cambridge, Ohio

There's A TABOR ROLLOVER TO FIT THE JOB!



PICTURED is only one of Tabor's large and diversified family of foundry-proved Rollovers. This one's a 3,000-lb. capacity, *shockless* job. The rollover plate is 40″ wide x 50″ long. When air-operated flask clamps are used (as shown), it handles pattern boards ranging in length from 24″ to 56″. Even with modest pit requirements, the plate is only 15″ above floor level for easy workability. Accommodates a 43″ deep flask (including pattern board and bottom boards)—minus the draw required. Maximum draw on the unit shown is 15″. With modifications we can provide for a 55″ flask depth on the basis outlined above, and a 20″ draw.

Tabor Power Rollovers run the gamut of size and type. They range from 450-lb. to 3,000-lb. capacity. All are *completely* power-operated and can be furnished with air-operated flask clamps. You can choose between plain or shockless jar, and some types are portable. All incorporate Tabor's famous air-on-oil principle for a perfect draw. All perform up to full rated capacity, completing a cycle of operations in the fractional part of a minute.

Complete Rollover family is presented in Bulletin #534 —just off press. Write for your copy. Then team up with Tabor for a quick and satisfactory solution to any Rollover problem.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif.; The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H Reich, Trussville, Ala

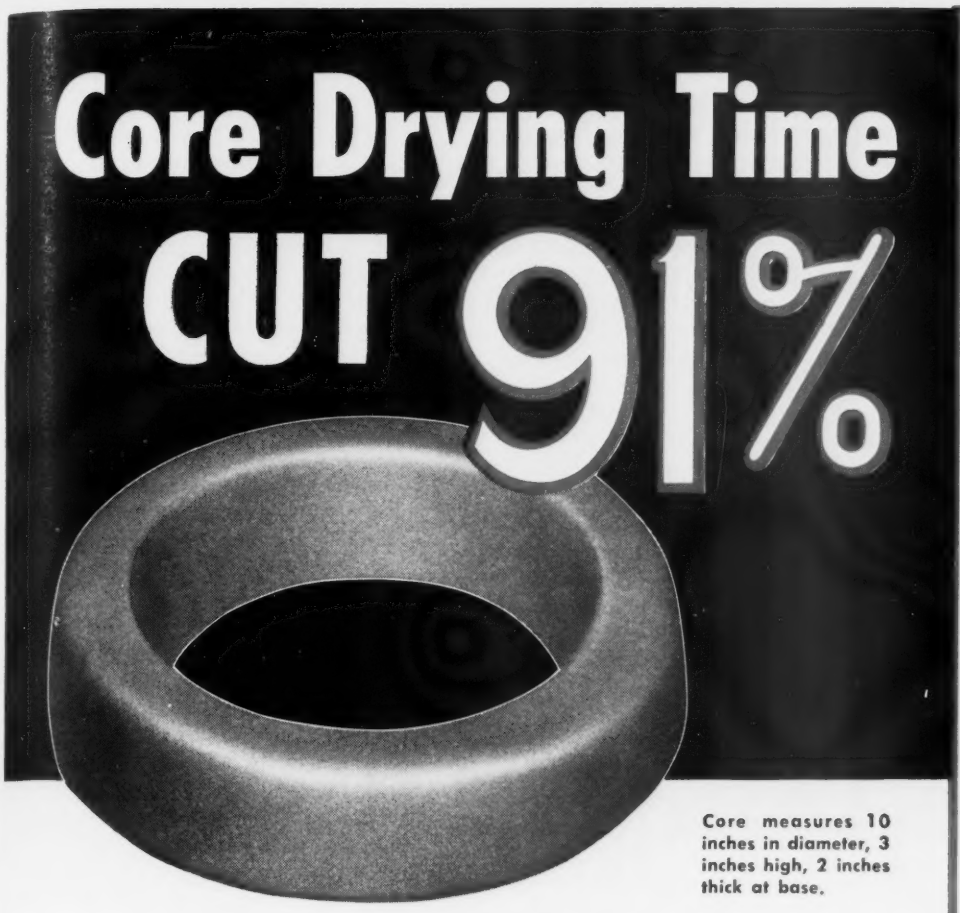
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

EXPORT DEPARTMENT, 765 DREXEL BLDG., PHILA. 6, PA.

Core Drying Time CUT 91%



Core measures 10 inches in diameter, 3 inches high, 2 inches thick at base.

OLD TIME — 70 minutes *in conventional oven*

NOW — 6 minutes *in dielectric dryer*

Fast drying is a big story, but it is not the whole story! When this core comes out of the dryer, it is cool, dry, and ready to go right to the molder. This means cores can be made only as they're needed. In many foundries hundreds of square feet of valuable floor space can be converted from core storage to productive area, by changing to *Foundromatic* core dryers.

And in addition, they give you these benefits:

- Complete elimination of overbaking or burning of cores — even cores with thin sections.
- Good core finish.
- Easy shakeout.
- Fuel savings up to 60%.

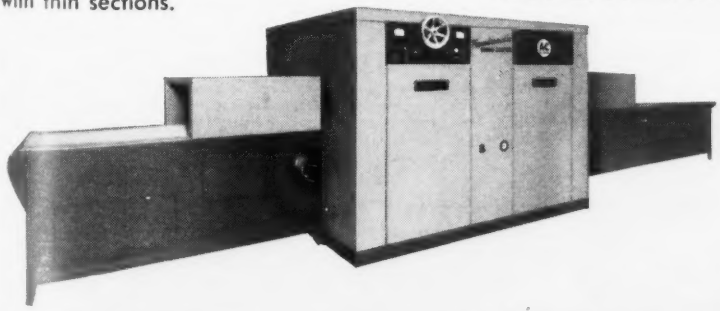
IMPROVED DESIGN

Now, new higher capacity, new compact design makes the latest *Foundromatic* core dryer a better investment than ever. Core drying capacity is increased as much as ⅓ (in the 25-kw size).

Call your nearby A-C district office for complete specifications. Or write Allis-Chalmers, Milwaukee 1, Wis.

Foundromatic is an Allis-Chalmers trademark.

A-4097



ALLIS-CHALMERS

FOUNDROMATIC
Dielectric
SAND CORE DRYER

QUESTIONS and ANSWERS

About Dielectric Sand Core Drying

1. What dollar savings can I expect with the Foundromatic *core dryer?*
Savings estimates of 55% to 70% have been reported.

2. Can metal dryers be used?
Yes, metal dryers can now be used with no loss of production in specific applications.

3. Is auxiliary heat needed to cure cores on metal plates?
No! By providing an insulating or non-metallic material between the core and the metal plate, cores may be cured without auxiliary heat.

4. How large a core can be dried?
Cores that will pass through an aperture 36 inches wide and 13 inches high can be dried. One foundry is drying a core weighing 950 pounds in the *Foundromatic* dryer.

5. Fuel savings of 60% are mentioned. How is this possible?
The dielectric heater delivers no power unless there is actually material between the electrodes. This means all the heat goes into the core. This makes for comfortable working conditions, too.

SEND

Allis-Chalmers
Milwaukee 1, Wisconsin

Please send me specifications on the improved *Foundromatic* sand core dryer.

Name .....

Title .....

Company .....

Street .....

City ..... State A-4097

There's a job-designed Imperial SAHARA BELT to cut your belting costs

YOU EXPECT MORE AND YOU GET MORE FROM IMPERIAL

Write for information and case histories.

Imperial BELTING CO.

1754 S. Kilbourn Avenue
Chicago 23, Illinois

FIRST in stitched canvas belting for over 40 years

With the Editors

WE TAKE PRIDE: How quickly the year has moved along. It hardly seems possible that this is copy for the December issue, and that in a few days we will be working on the first issue for 1954.

Looking back over the past 12 issues, the editors are rather pleased with the results of their labors. In addition to a well balanced array of articles covering a wide variety of practices, problems and developments, a number of features presented have been well received.

The March issue included a 54-page article on the new Ford foundry in Cleveland. This was probably the most complete plant report ever presented in a single issue of FOUNDRY. The May issue, carrying the program and other details of the Chicago annual meeting of AFS, also presented a 36-page report on "Progress in Castings" which was prepared by a number of authorities in the field of castings.

The June & July issues carried staff-written reports on all phases of the AFS meeting. September carried specially prepared articles on the foundry industry in seven countries in Europe and detailed reports of the Paris International foundry congress appear in November and December. Yes, the editors feel it has been a special year.

—o—

Without Prefix: A few years ago I was one of five visiting firemen attending a Texas Regional Conference at Lufkin. All of us had a wonderful time, thanks to a generous amount of true Texas hospitality.

I have not been able to get back to the fine state since that visit. To try to induce me to return, Ed Trout, vice president, Lufkin Foundry & Machine Co., recently gave me the license (reproduced below) which, according to the attorney general of the great state of Texas, says I can enter the state as Yankee Investigator, without prefix. Thanks Ed, and I will try to do better. But somebody told me the other day that he is an admiral in the Texas navy. How about that?

—o—

People: One of the interesting monthly employee publications that crosses my desk is *Brake Shoe News*, published by the American Brake Shoe Co., with offices in New York and foundries in practically every section of the country. The October number, "A Special Issue Devoted to the People of Brake Shoe," is quite impressive with its many photographs to provide "a portrait of the people of American Brake Shoe Co." It starts with the premise that "A company is buildings and equipment and products, but basically it is people," and then goes on with various sectional headings to show "Our people have experience," "Our people are young and enthusiastic," "Our people have ideas and plans," and

(*Concluded on page* 12)

OFFICE OF THE

Attorney General

KNOW ALL MEN BY THESE PRESENTS, that

FRANK STEINEBACH

upon the testimony of friends who are known to be bona fide Texans, has been found to be a good fellow, and is hereby given license to enter the borders of the State of Texas as a

YANKEE INVESTIGATOR

with privilege and authority to investigate the oiliness of the oil, the soiliness of the soil, the beauty of Texas women, and the bigness of everything in the Lone Star State. This license is granted in perpetuity and represents full protection against being fired upon as a carpet bagger or deported as a wetback. All citizens are instructed to refer to the bearer as a "Yankee," in one word, without prefix.

ATTORNEY GENERAL'S OFFICE · STATE OF TEXAS

ISSUED AT AUSTIN, the 25 day of September, A. D. 1953.

John Ben Sheppard

JOHN BEN SHEPPERD
ATTORNEY GENERAL

INTERESTED IN *Reducing* SCRAP LOSS?

try Harbison-Walker's

Refractory Strainer Cores

Many foundries have reduced scrap loss and improved their castings by adopting Harbison-Walker Refractory Strainer Cores. Made of a hard, strong ceramic material, moulded under pressure and kiln-fired at a high temperature, they are uniformly accurate in shape and size, cleanly formed, non-spalling, erosion-resistant and economical.

With equivalent gate diameters ranging from ⅝-inch to 1½-inch, Harbison-Walker Refractory Strainer Cores in seven sizes provide for all normal requirements.

Cleaner castings are made when Harbison-Walker Refractory Strainer Cores are used; chipping, welding and grinding are substantially reduced; scrap losses are decreased; production is increased and labor costs are reduced.

Now available for prompt shipment, Harbison-Walker Refractory Strainer Cores are packed in sturdy cartons of a size and shape most convenient for the moulder. Write for bulletin describing this modern aid to economical foundry operation.

HARBISON-WALKER REFRACTORIES COMPANY AND SUBSIDIARIES

World's Largest Producer of Refractories
General Offices: Pittsburgh 22, Pa.

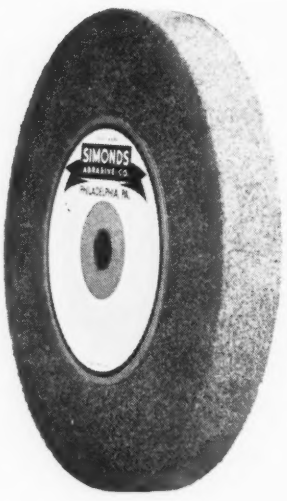
The cost man figures they're money-makers!

SIMONDS ABRASIVE CO.

Grinding Wheels

Any way he figures it . . . production per wheel-dollar, less down time, fewer rejects . . . Simonds Grinding Wheels pay-off. You, too, can get satisfaction, savings and long productive service in these quality controlled wheels. Right now they're proving their value throughout every phase of industrial grinding in terms of top output, accurate performance and consistently superior results. Complete line includes grinding wheels, mounted wheels and points, segments and abrasive grain . . . all available through your Simonds distributor.

Write for free data book and name of your Simonds distributor.



SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON

DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y. Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

(*Concluded from page* 10)

"Our people have strength." Sections also are included to show people of many skills, people of all backgrounds and interests, and the fairer sex. Bill Given, chairman of Brake Shoe, closes the issue with "My greatest hope is you will continue to make Brake Shoe a better place to work in the years to come."

—o—

Early Furnaces: H. L. Gebhardt, president, United Oil Mfg. Co., Erie, Pa., takes particular delight in seeking out and photographing the remains of the many early iron furnaces that operated in the eastern section of the country. Now, some of the results of this interesting hobby have been made available to those interested in one phase of the early days of the American metalworking industry. The United Oil Mfg. Co. recently published an attractive booklet illustrating and describing a number of these furnaces. The booklet is entitled "Some Old Iron Furnaces of Western Pennsylvania." The general theme of the booklet may be found in its introduction:

It happened too long ago for Grandfather to remember. That's why we are writing down a few facts so Junior won't forget—forget the days when iron was made the hard way, when furnaces built with stone sprang up wherever bog ore gave promise of profit. For 200 years this had been the pattern, from the Saugus River venture of 1643 in colonial Massachusetts to 1843 when the Victory furnace was built South of Erie. Ore was where you found it, and furnaces followed the ore. Charcoal was easily produced because the woods were everywhere, and it looked as though this way of making iron was here to stay.

Then, something happened that changed the picture. Three years after Victory was built, a furnace went on blast thirty miles away that started using bituminous coal instead of charcoal, and then took on Lake Superior ore instead of the native bog variety. This was called the Clay furnace in honor of Henry Clay. It was the beginning of a new day for iron. A pattern which had survived for 200 years was passing. Shortly after this new ore and fuel appeared, the Victory furnace closed down for keeps. Only one more bog ore furnace was built in Western Pennsylvania, and that one was doomed to a short life. Iron had come of age, it was ready for coke, and began growing fat on ore from the Mesabi Range.

The booklet is well illustrated with photographs of a number of furnaces as they are to be found today, and a drawing illustrating the method of charging. The cover carries the reproduction of a color photograph of the Victory furnace south of Erie, perhaps the best preserved of all the early furnaces. Copies may be obtained from the company, 1429 Walnut St., Erie, Pa.

—o—

Our Wish: Beyond the season's greetings from all of us as expressed on the cover of this issue, the editors join with me in the fervent wish that in some way, peace on earth, good will toward men may be made a reality in the year ahead.

F.G.S.

BONDING CLAY **FIRE CLAY**

Best Wishes
for a
Happy Holiday Season

CEDAR HEIGHTS CLAY CO.

50 PORTSMOUTH ROAD
OAK HILL, OHIO

DRAVO CONDITIONERS SAFEGUARD HEALTH, ASSURE HIGHER PERFORMANCE AT THIS LARGE MIDWESTERN METALLURGICAL COMPANY...

To safeguard the health of crane operators and increase their alertness, and efficiency, a large midwestern metallurgical company installed Dravo Crane Cab Conditioners in the crane cabs operating over 6 submerged arc smelting furnaces. Dravo Crane Cab Conditioners provide constant year-'round ventilation, filter the air, and remove harmful dirt, dust and fumes. Crane operators' working conditions are greatly improved resulting in higher performance and increased efficiency.

No matter what radical temperature variations or atmospheric conditions occur in your industry, there's a Dravo Crane Cab Conditioner designed for your specific needs.

HERE ARE THE *Plus* ADVANTAGES DRAVO CRANE CAB CONDITIONERS AND COOLERS OFFER YOU

1. COOL AND CLEAN AIR SUPPLY
All self-contained and split-type Dravo Crane Cab Coolers are equipped with a forced-ventilation system, insuring a supply of cool air free from dust and fumes to the compressor motor.

2. RUGGED CONSTRUCTION
Dravo Crane Cab Coolers and Conditioners are supported by a structural steel frame of all-welded construction.

3. MAXIMUM VOLUME OF AIR
All units are equipped with centrifugal-type squirrel-cage fans which furnish maximum amount of air.

4. HIGH EFFICIENCY
Condenser discharge air exhausts directly into atmosphere, permitting lower operating temperatures within condenser section.

5. CONTROL PROTECTION
Heavy-duty industrial controls are enclosed in a forced-ventilation cabinet, free from dust and fumes.

6. COMPLETE LINE OF EQUIPMENT
Only Dravo has a complete line of crane cab coolers and conditioners. Interchangeable parts reduce inventory costs.

AVAILABLE FOR PROMPT DELIVERY. Installation of Crane Cab Coolers and Conditioners is quick and easy with a minimum of downtime required. Write for Bulletin RX-130 -809, or phone the nearest Dravo sales office and have our representative call on you.

DRAVO

DRAVO
CORPORATION
Air Conditioning Department
Dravo Building, Fifth and Liberty Avenues
Pittsburgh 22, Penna.
ATLANTA • BOSTON • CHICAGO • CINCINNATI
CLEVELAND • DETROIT • INDIANAPOLIS • NEW YORK
PHILADELPHIA • PITTSBURGH • ST. LOUIS • WASHINGTON

FEEDING A PRODUCTION-HUNGRY PLANT WITH A

One Cubic Yard "Spoon"

Feeding raw materials to a production-hungry plant is just one of many uses for the multi-purpose Allis-Chalmers HD-5G Tractor Shovel. It receives bulk materials, then carries them directly to mixing hoppers, conveyors or storage as needed. In addition, this powerful crawler excavates for new construction, handles coal, cleans up and loads waste . . . also clears snow and maintains yards and parking areas.

Interchangeable attachments, such as bulldozer blades, special buckets, lift fork, crane hook and trench hoe, add still further to its usefulness.

Tractor Shovels are also available on the three larger sizes of Allis-Chalmers crawler tractors, giving a range of standard buckets from one to four cubic yards — and up to seven cubic yards for light materials.

Let your Allis-Chalmers dealer tell you more about how you can mechanize your materials-handling the efficient tractor shovel way.

Receives Material at Plant

The HD-5G scoops a heaping load of any material at the unloading trestle, then delivers it directly to mixing hopper, conveyor, or storage area. Truck wheels, idler and support roller bearings are positively sealed against grit and moisture and require lubrication only once every 1,000 hours. This feature alone saves about 30 minutes' greasing time a day.

Builds Storage Piles—*Anywhere*

This fast-working tractor maintains large stockpiles in the open or under a protective shed. Crawler tracks provide traction and flotation to work right up on the pile, enabling it to put many more cubic yards of material into a given area. Tracks also give long life in cullet and similar material as only steel can.

Keeps Production Moving—*Fast!*

The HD-5G feeds bulk materials in exact required amounts for uniform mixture — a full cubic yard at a scoop. In handling light materials, a two cubic yard bucket doubles output. Special fast reverse greatly speeds operation on short runs. This flexible tractor starts boosting production as soon as it's put on the job . . . no waiting for costly installations or changes in plant layout when you mechanize materials handling the Allis-Chalmers tractor shovel way.

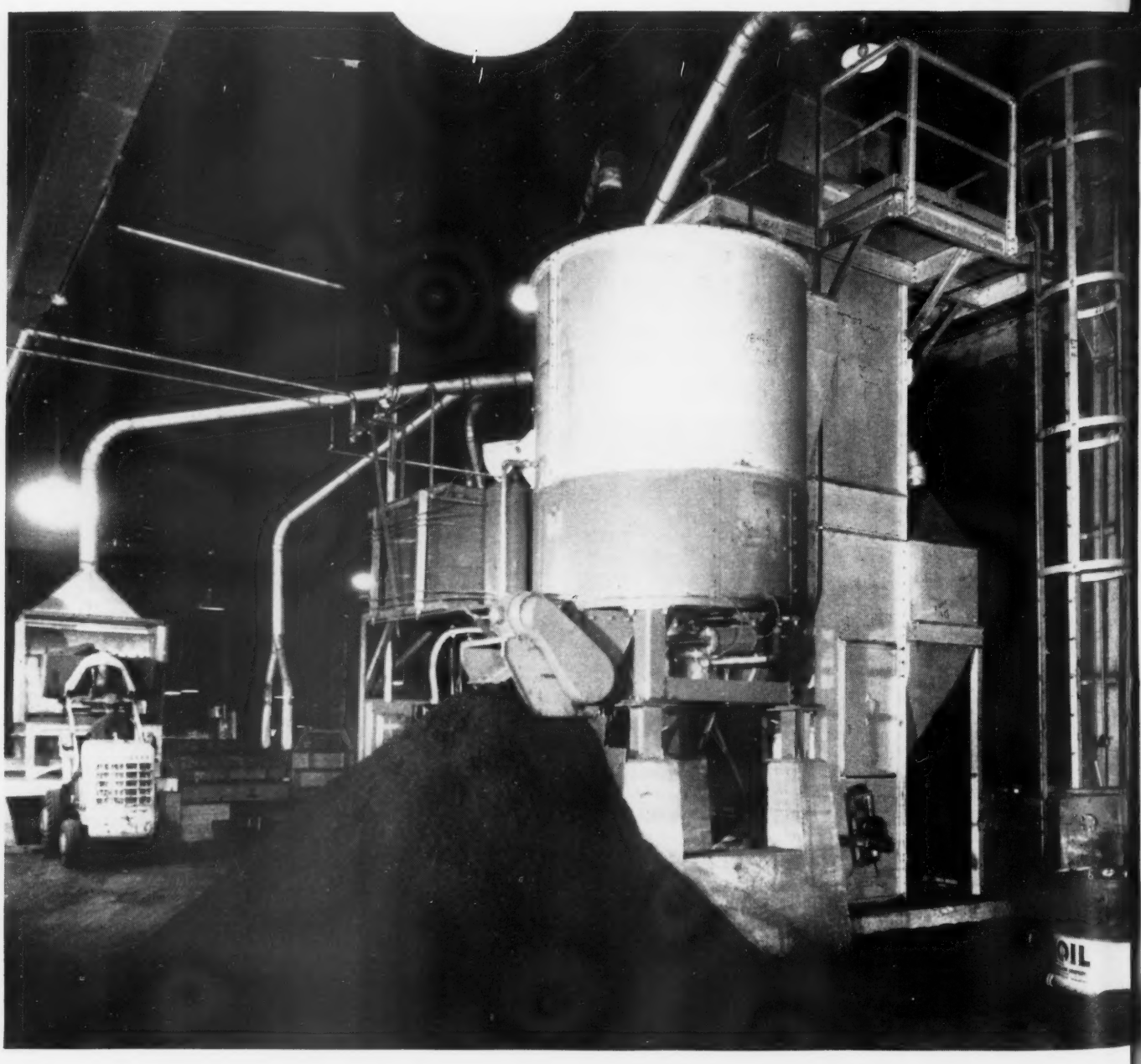
ALLIS-CHALMERS

TRACTOR DIVISION — MILWAUKEE 1, U.S.A.

NATIONAL *UTILITY UNIT*

saves over $15,000 in first year's operation

. . . HELPS INTERSTATE FOUNDRY CO. IMPROVE WORKING CONDITIONS AND ESTABLISH WAGE INCENTIVE PLAN



● Typical *Utility* Unit table-level shakeout-spruing station operated by Interstate Foundry Company. Sand is returned to 2F MIX-MULLER on belt at left. Castings and used sand are collected and charged to double deck screen through hopper by truck at rear.

THIS month, as they have for over 15 months, Interstate Foundry Company, Indianapolis, Indiana, jobbing foundry, is saving about $1,300 by preparing their sand faster, more efficiently and with fewer men. The reason? The company processes up to 200 tons of sand in 8 hours with the National *Utility* Sand Preparing Unit shown at left. Six men now do the work of 12. Each earns from 18 to 20% more for from five to twelve fewer working hours each week.

In twelve months of operation, savings in *manpower* alone have amounted to $15,000 . . . much of the costly manual handling of molds, sand and castings has been eliminated. Maintenance of sand preparing equipment has been rendered negligible. The rugged new 2F Simpson MIX-MULLER properly prepares more sand in 6 hours than was previously made up in 10 to 12 hours. With even, controlled distribution of bond and moisture content, the quality and workability of the sand has improved by 50%.

To employees—Interstate has been able to pass on these savings in the form of a unique wage incentive plan — permitting *fewer* men to make *more* money during fewer working hours. To Interstate jobbing customers—these improvements mean quicker delivery, excellent castings at reasonable prices.

To YOU these savings are cited as typical of the dollars and cents return that can be realized in liberating sand from costly and inefficient floor heaps with the National *Utility* Unit. A National engineer can show you, through example and from your own records, how the cost of a National *Utility* Unit can be amortized in from 2 to 3 years.

Write today for bulletin #508.

National Engineering Company
(Not Inc.)
608 Machinery Hall Bldg. • Chicago 6, Illinois

NATIONAL SAND and MOLD HANDLING EQUIPMENT
NATIONAL SAND RECOVERY SYSTEM

SIMPSON
Intensive
MIX-MULLERS

Pictured here is one of nine No. 920 Clearfield Mixers, all in one of the largest industrial plants in the East.

make your continuous sand handling system really efficient

with a

Clearfield Mixer

Clearfield Mixers perform perfectly in continuous sand handling systems. Their short mixing cycle, which can run as low as one minute, permits constant delivery of prepared sand either by the use of multiple mixing units or by the provision of storage bins preceding and following the mixers.

There's a Clearfield Mixer for every sand preparation need. Write today for Catalog No. 83 for complete details.

CLEARFIELD MACHINE CO.

CLEARFIELD, PENNSYLVANIA

Tough double load problem solved by mounting crane wheels on TIMKEN® bearings

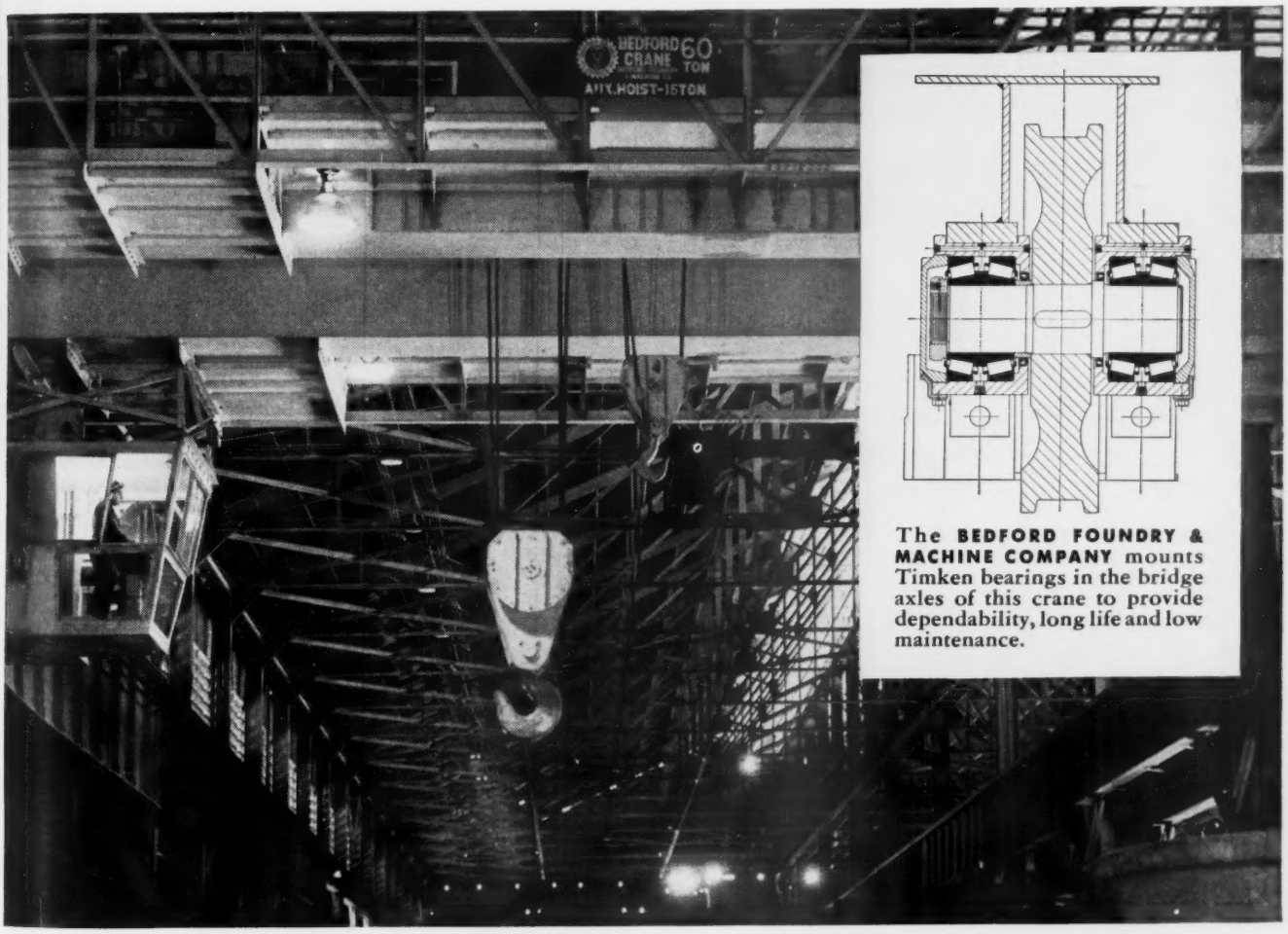
DOUBLE duty! That's the performance that Timken® tapered roller bearings deliver in this 60-ton crane, built by Bedford Foundry & Machine Company.

Mounted on the bridge axles, Timken bearings do the job of both radial and thrust bearings. They handle the continuous, heavy radial load of the loaded hook *plus* the rugged thrust load imposed by the hook's pendulum swing. The reason is simple. Tapered construction of Timken bearings enables them to take tough radial and thrust loads in any combination.

Also important, Timken bearings help lower power bills. The true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction. As a result, the wheels start quickly and turn smoothly. Less starting current is required. Electric bills are reduced.

To solve dual or multiple load problems in the equipment you build or buy, always specify Timken bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED — *This symbol on a product means its bearings are the best.*



The **BEDFORD FOUNDRY & MACHINE COMPANY** mounts Timken bearings in the bridge axles of this crane to provide dependability, long life and low maintenance.

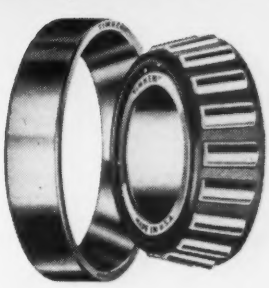
IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

READY-MADE

Solutions to SPECIAL Dust Problems

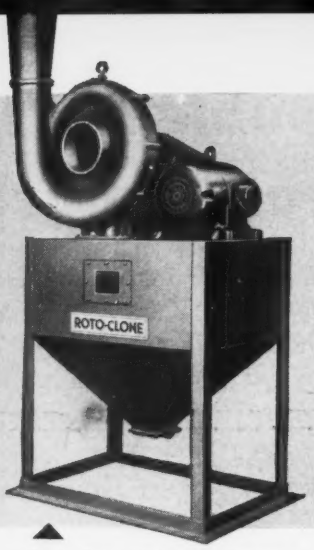
ROTO-CLONE'S WIDE RANGE OF DESIGNS PERMITS TAILORING SYSTEM TO YOUR SPECIFIC NEEDS AT STANDARD EQUIPMENT COST.

We know from 20 years' experience that no two dust problems are exactly alike. That's the reason for the wide, diversified line of Roto-Clone* equipment pictured here. Every one of these designs was at one time a "special"—tailor-made to solve a specific dust-control problem. Today, they are *standard* items which may be adapted readily and economically to scores of applications.

Every dust problem is still a "special" to AAF engineers—but the solution will likely consist of just that right combination of proven Roto-Clone features which, because they are "standard," means savings to you of both time and money.

Run over your list of dust-producing operations. Pick out the "problem child" of the lot, then call your local AAF representative. From our 20 years' experience and the world's most complete line of dust-control equipment, we're certain to come up with the right solution at the right price.

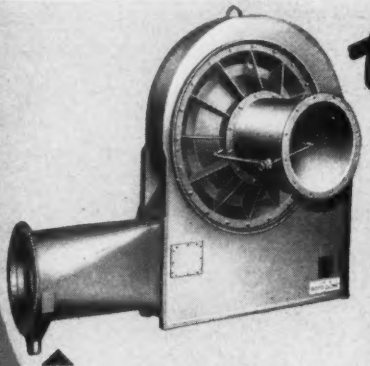
**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*



Type D mounted on hopper which serves both as storage container and separating chamber for removing dust from secondary air circuit.

type D ROTO-CLONE

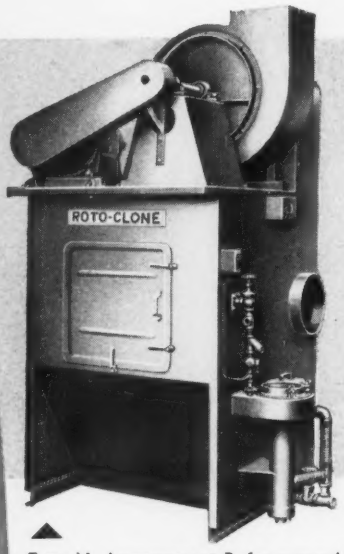
This dynamic precipitator com bines the functions of exhaust and dust separator in a sing unit. Its wide acceptance as dry collector of granular proce dust is due to many factors— ease of installation, compact de sign, trouble-free performanc and uniform high efficiency i dust separation.



Type W, Arrangement A. Designed for lighter dust loads, it features smaller space, high collection efficiency and lowest cost.

type W ROTO-CLONE

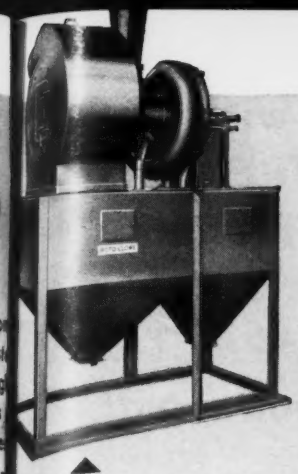
A dynamic precipitator whic by the addition of a movin water film on the collecting su faces, extends its high cleanin efficiency to the collection of th lightest and finest dust particle eliminates wear from abrasio and delivers the collected du as a sludge for easy disposa or reprocessing.



Type N, Arrangement B, for manual removal of sludge from small capacity Roto-Clones. Sloping side of reservoir speeds cleaning operation.

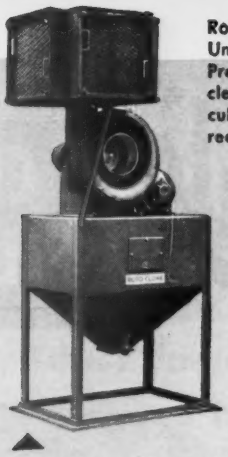
type N ROTO-CLONE

This hydro-static precipitator ob tains its high cleaning efficien from the scrubbing and centr fuging action in the impelle and thorough intermixing o water and dust-laden air. Wate recirculation is obtained withou pumps or other moving part Removal of the collected mat rial as a sludge or slurry elim inates secondary dust proble



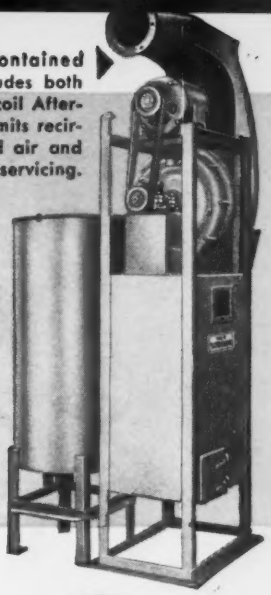
Type D with Skimmer Precleaner for handling exhaust air containing chips or heavy concentrations of abrasive dust.

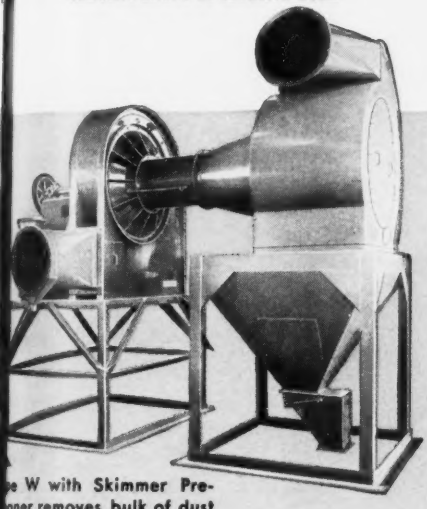
Roto-Clone Self-Contained Unit exhausts, separates and stores the dust plus filters the air before return to workroom.



Type D with Filter Aftercleaners extends Self-Contained Unit advantages to larger exhaust volumes.

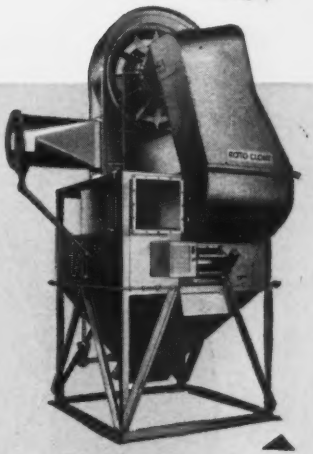
Roto-Clone Self-Contained Unit Model R includes both Precleaner and Cycoil Aftercleaner. Cycoil permits recirculation of cleaned air and requires infrequent servicing.



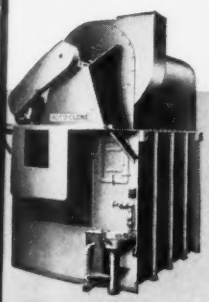


e W with Skimmer Preoner removes bulk of dust for salvage; remaining es as sludge or slurry.

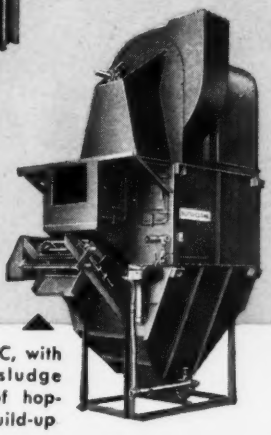
Type W, Arrangement D, with Wet Precleaner and hopper designed with sludge drain for continuous disposal of heavier dust loadings as slurry.



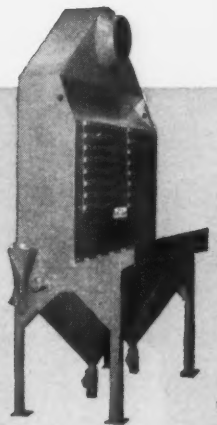
Type W, Arrangement C, with Wet Precleaner and Automatic Sludge Ejector. The most complete dust-control unit ever devised regardless of dust loading.



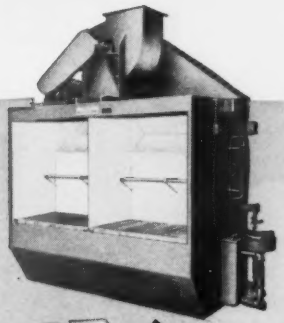
Type N, Arrangement B, for manual removal of sludge from large capacity Roto-Clones. Flat bottom design increases sludge storage space.



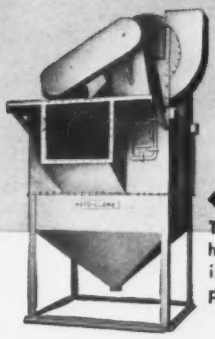
Type N, Arrangement C, with Type W automatic sludge ejector. Steep walls of hopper prevent material build-up



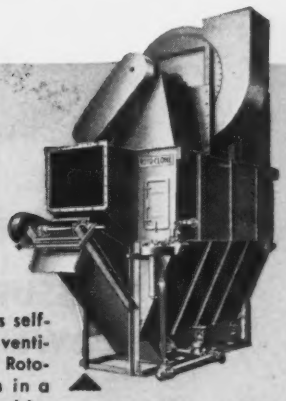
Type N, Arrangement X. Special adaptation of Type N Roto-Clone for collecting explosive dusts.



Type N Bench—provides self-contained downdraft ventilated workbench and Roto-Clone dust collection in a single, compact assembly.



Type N, Arrangement D, with hopper designed for sluicing collected material to process or disposal point.



Type N, Arrangement C, with Type L automatic sludge ejector is provided in large capacity Roto-Clones to keep overall height to a minimum.

American Air Filter

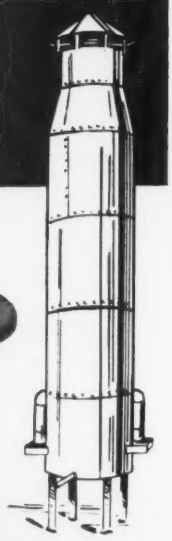
COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky

American Air Filter of Canada, Ltd., Montreal, P. Q. • Pacific Division Office, San Francisco, California

"Buffalo"

CUPOLA BLOWER

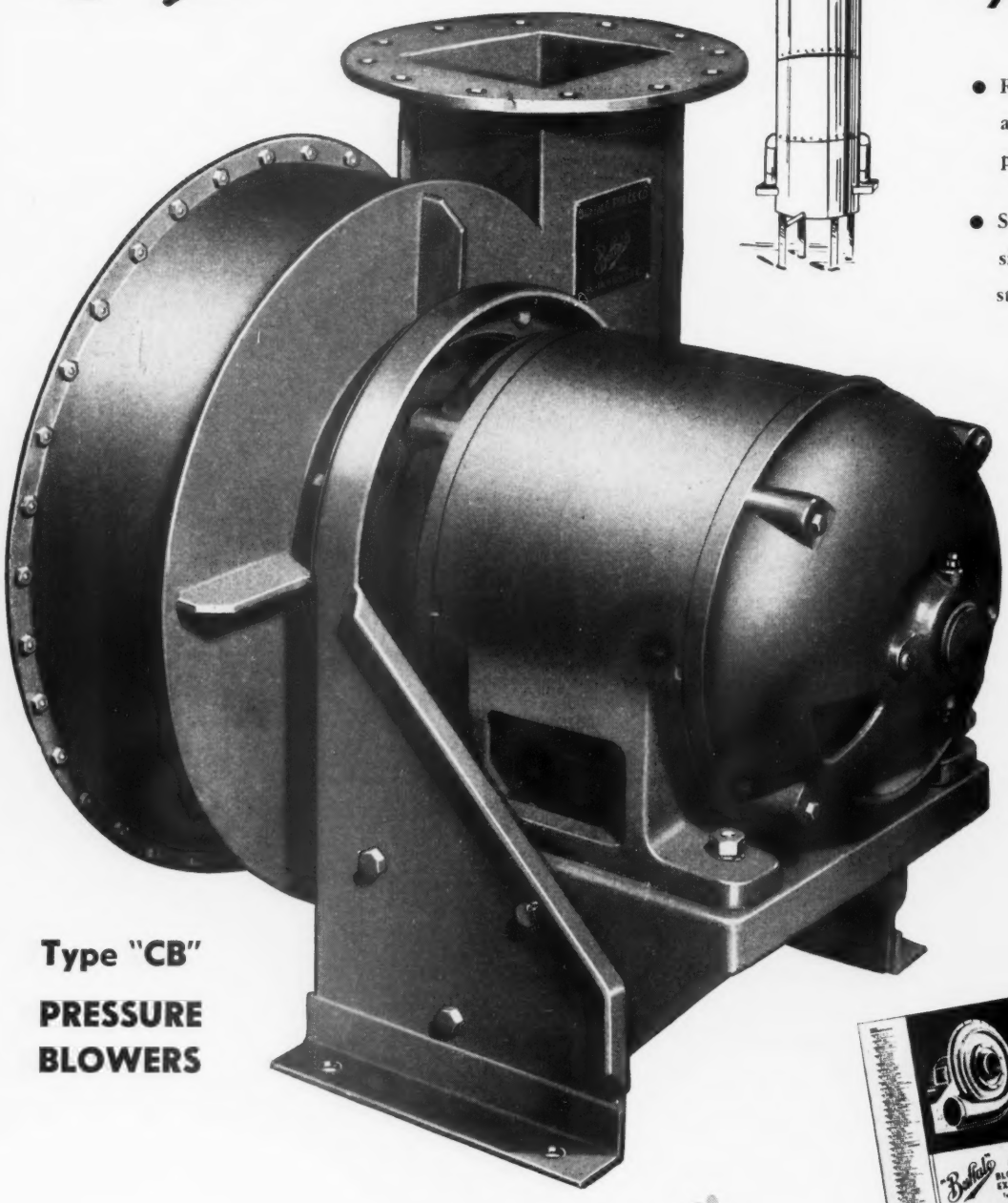


—with the STRENGTH, EFFICIENCY and COMPACT SIZE *you need!*

- Rugged, dynamically balanced rotors of heavy steel plate, riveted or welded
- Steel plate housings with sides ribbed for extra strength—base rigidly braced
- Up to 2¼ lbs. pressure, single stage, with these compact direct drive blowers—in sizes from 150 to 8000 cfm.

FACTS
For Your Files

For pressure facts write for Bulletins 3553 and 3014.



Type "CB"
PRESSURE BLOWERS

FIRST FOR FANS

BUFFALO FORGE COMPANY

221 MORTIMER ST. BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

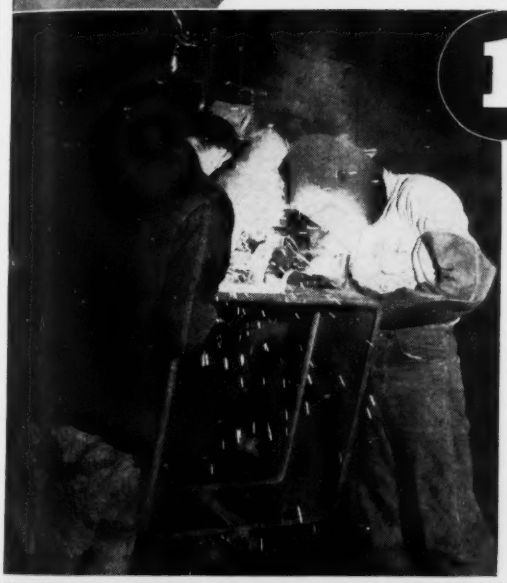
Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

VENTILATING FORCED DRAFT | AIR CLEANING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT PRESSURE BLOWING | EXHAUSTING

WESTINGHOUSE • PRIER BRASS MFG. CO. • READING GRAY IRON CASTINGS, INC.
McNALLY-PITTSBURG • RIVERSIDE FOUNDRY CO. • BLUE VALLEY FOUNDRY CO.
E. L. LeBARON FOUNDRY CO. • STANDARD FOUNDRY CO. • HARTFORD ELECTRIC STEEL CORP.
BULLARD CO. • WELLMAN BRONZE • COOPER ALLOY • TEXAS ELECTRIC STEEL

Two Good Reasons Why These and Many Other Famous Foundries have switched to

BS&B FOUNDRY FLASKS



1 The way they're made

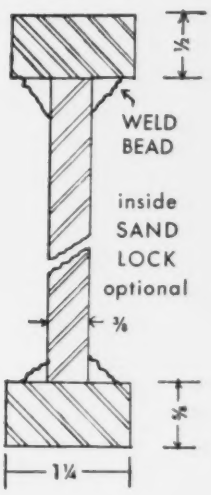
BS&B Foundry Flasks are designed by men with actual foundry experience. They know from experience the features you want! From their designs, BS&B's skilled workmen can turn out a flask tailor made for you. Your BS&B Flask will have the greatest rigidity, with minimum weight for easy handling. BS&B Flasks are constructed entirely of steel . . . all parts joined together with electric arc welding . . . sections are surface ground or machined, top and bottom, to insure a tight joint at the parting line . . . pinholes fitted with removable hardened steel bushings—round and oblong. Pinlug arrangements to your individual requirements.

2 The way they stand up

Pennies make you dollars where BS&B Foundry Flasks are concerned. Maybe you do pay a little more for BS&B Flasks . . . but you get dollars of extra value. BS&B Flasks require a minimum of maintenance year in and year out. They stand up—turn out better casings, keep scrap down. Actually, BS&B customers report six-eight-ten even twelve years of operation—without maintenance expense! Here's proof BS&B Foundry Flasks are built to stand continued use under hard working conditions and vigorous shake out. Cost records maintained by many foundries prove BS&B Foundry Flasks withstand more castings per flask throughout their service life.

Have a really tough, heavy casting job to do? Then put this one into service

BS&B Heavy Duty Flask Style FP 22

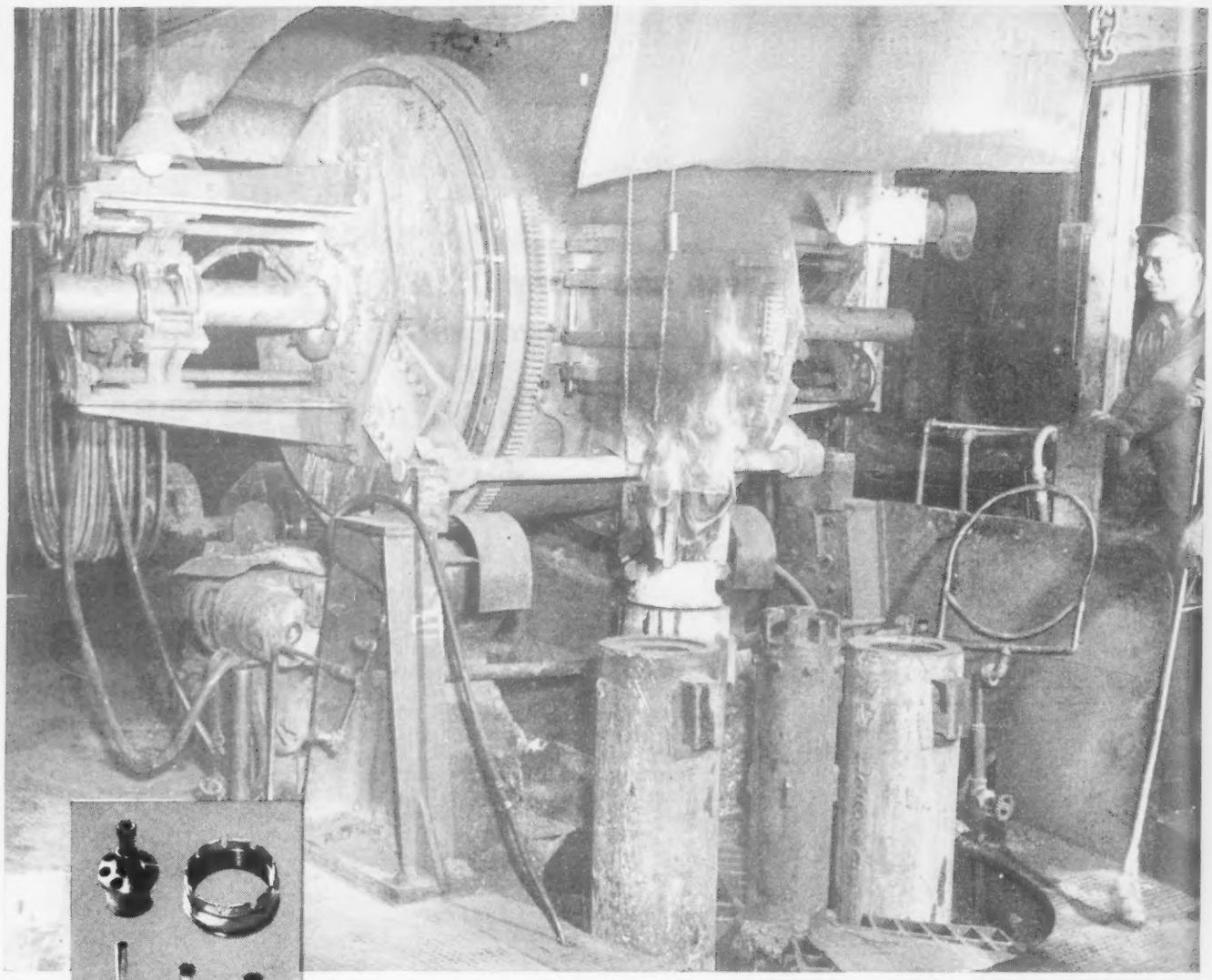


The only flask made combining these three features: (1) Welding of bearing strips, both inside and out; (2) Cast steel trunnions; (3) Cast steel pinlugs and clamplugs. Reinforcing rib is optional. Design and method of fabrication eliminates corner cracking and breaking out.

Write for FREE BS&B Foundry Flask Handbook
a handy catalog and useful foundryman's "bible"
includes easy-to-order system.
Foundry Flask Div.—Dept. 7-AR12

FOUNDRY OUR 60TH YEAR BS&B FLASKS

BLACK, SIVALLS & BRYSON, INC.
7500 East 12th Street Kansas City 26, Missouri



Some of Mueller Brass Company's products made from DEF-melted alloys.

11 tons of copper alloy billets from this furnace every 24 hours

In this nose-tilting, 1000-lb. capacity Detroit Rocking Electric Furnace at Mueller Brass Company, alloys are changed from heat to heat. Yet it melts and pours about 11 tons of billets every 24 hours.

It's a good example of the versatility and fast-melting characteristics of Detroit Rocking Electric Furnaces. Each heat produces a billet of precisely controlled analysis. Rocking action of the furnace makes most efficient use of the heat from the indirect arc, guarantees homogeneity of metal. High quality metal means fewer rejects, better products.

Detroit Electric Furnaces, in capacities from 10 to 8000 lbs., are outstanding producers for both ferrous and non-ferrous metals. Outline your requirements and we'll give you complete information to bring new efficiency to your metal melting. Write today!

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sau Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

...Another job a Dings Magnet does better—

...Milwaukee Foundry uses Lifting Magnet to transport Heavy Castings from Shakeout

THAT'S a 39-inch Dings Lifting Magnet (above) in action at a steel company in Milwaukee.

This is one of the many firms that has learned that Dings Magnets are a fast, economical and manpower saving means of handling materials.

They can be used to charge tumbling barrels, load electric furnaces. And they're the most economical means of handling scrap metal anywhere.

Dings Lifting Magnets are available in diameters from 29" to 65" with capacities ranging to 65,000 lbs. (slabs).

Maybe there's a job they can do better in your plant. Call your representative today and send the coupon for Catalog B-1401-A giving construction features capacities and other data.

Dings

DINGS MAGNETIC SEPARATOR CO.

4708 W. Electric Ave., Milwaukee 46, Wis.

Gentlemen:

☐ Please have a representative call
☐ Please send me Catalog B-1401-A

Name_____ Title_____

Firm_____

Phone_____ Address_____

LM453

WHICH ELECTRODE will give you higher tonnage? . . . You're absolutely right: you can't tell by looking. We can't either—and we've been making electrodes for more than half a century. Fact is, when it comes to electrodes there's only one way to be sure: *test them on the job.* And with every new-type IGE Electrode that's just what we do. First, of course, we build into it all the properties we know it should have—controlled density, uniform structure, high purity and mechanical strength, low electrical resistance. *But* — before we put it into production we first put it into actual electric-furnace operation. We test it, we study it, we learn everything there is to know about its behavior. That way, we're never tempted to guess. We know that the high-tonnage electrodes are IGE Electrodes. And so do our many customers.

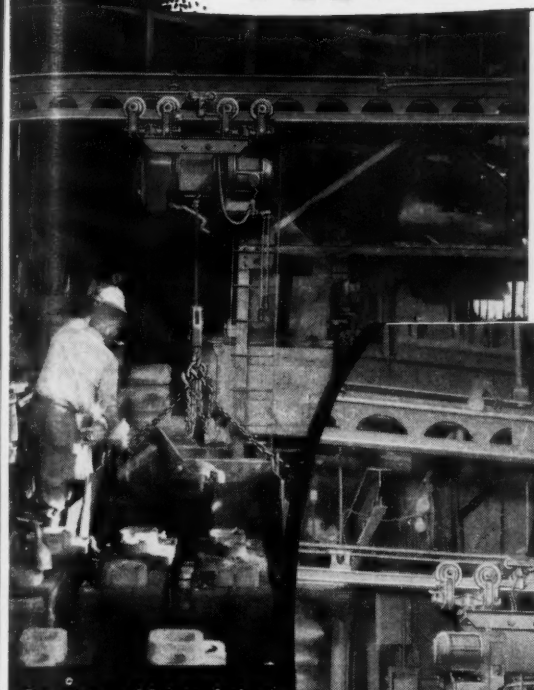
INTERNATIONAL GRAPHITE IGE & ELECTRODE DIVISION

SPEER CARBON COMPANY

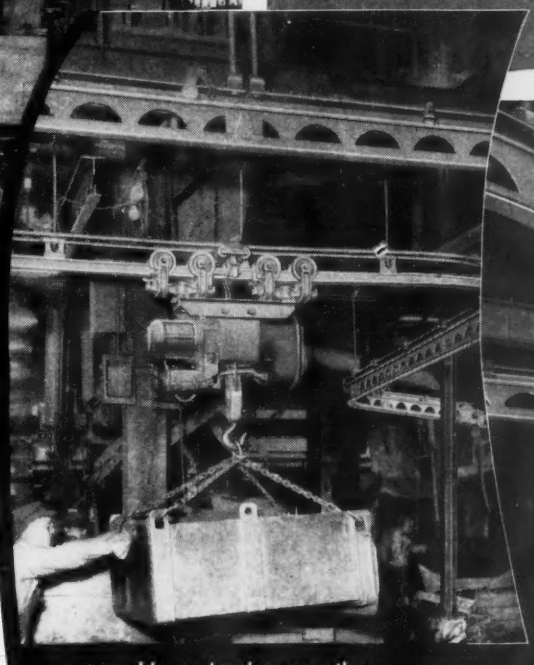
St. Marys, Pennsylvania

Other Divisions: Jeffers Electronics • Speer Resistor

3 TIME-SAVING STEPS IN HANDLING MOLDS TO SHAKEOUT



Dumping molds into shakeout box at pouring floor in a steel foundry.



Heavy loads are easily pushed on smooth overhead rails.

Molds are quickly emptied into shakeout by tipping box with air (or electric) hoist.

The handling of molds to shakeout is one of the many jobs simplified and speeded by overhead Cleveland Tramrail equipment.

Ten or more molds, depending on size are quickly dumped into a shakeout box at pouring floor. The box is conveyed to the shakeout on smooth overhead Cleveland Tramrail cranes and trackage by an easy rolling carrier that may be either of the hand-propelled or motor-driven type. When over the shakeout, it is quickly tipped and emptied by an air or electric hoist.

The same Cleveland Tramrail equipment also cuts costs in delivering molds to pouring floor and speeding pouring operations.

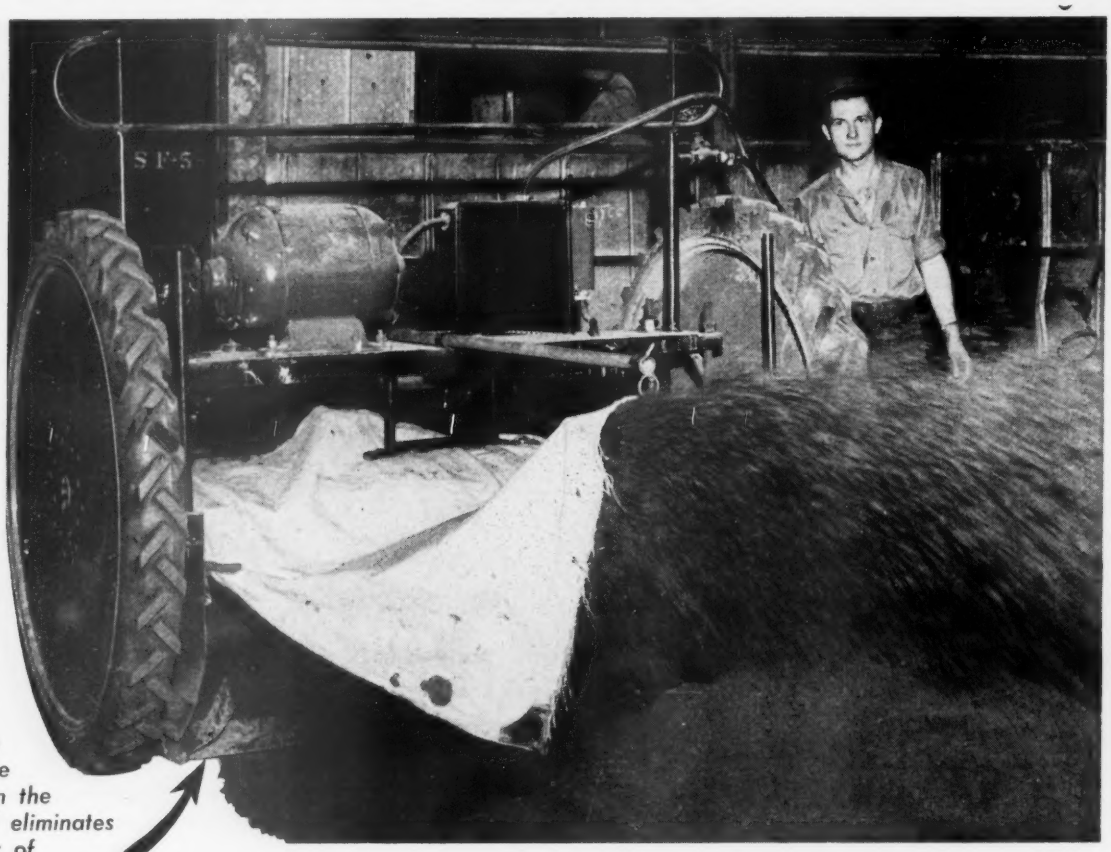
GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3802 East 286th St., Wickliffe, Ohio.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

DOES BETTER CONDITIONED SAND MEAN BETTER CASTINGS TO YOU?



This drag scoops the sand from the floor and eliminates any layer of unconditioned sand

This Moulders' Friend was rolled off a truck on to the floor of a North Carolina foundry where it conditioned all of the moulding sand without any rearrangement of the heaps. The Moulders' Friend will fit your foundry too.

THE MOULDER'S FRIEND GIVES YOU THOROUGHLY CONDITIONED SAND

The thousands of flat tempered steel wires in the brush revolving at high speed pick up small particles of used sand, added bond and moisture and blend them thoroughly. This process is so thorough that either clay bond or new moulding sand is blended with the heap successfully and a minimum of moisture is required. A portable screen and water dispenser are valuable added features.

THE BRUSH DOES THE JOB

●

THE MOULDER'S FRIEND SAVES MONEY . . .

capacity two tons per minute—one man operation—simple construction—easy to buy and use—pays for itself with better castings and labor saved.

Investigate The Moulders' Friend today. See one in operation.

"The Moulders' Friend"
Dallas City, Illinois

Now!

B&W SMOOTHSET

Available in Dry Form

Here's the mortar refractories masons asked for—and it's as easy to use with insulating firebrick as the popular wet B&W Smoothset because it has the same high water retention.

This property is important because the highly porous structure of insulating firebrick draws the moisture rapidly from the mortar, thus allowing too short a time for proper placing and setting of the brick before most mortars become unworkable.

Besides high water retention, the new dry B&W Smoothset can be stored indefinitely in a dry place without hardening—a big advantage on large jobs when refractories are installed over a long period of time.

In addition to helping you select the most economical refractories, your local B&W Refractories Engineer will be glad to help you select the best mortar for your installation. Next time you build or reline your furnace, get the benefit of his long experience.

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42ND ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R488

B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

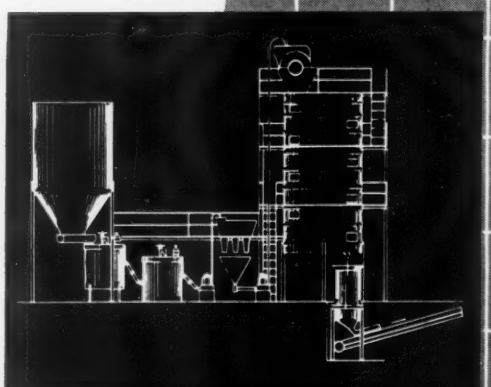
Save Sand . . . and Save Dollars

with a NICHOLS sand reclamation system

- Only Nichols offers both *high* temperature burning and *low* temperature drying, two different reclamation systems, to fit the specific foundry need.
- Reclaim used sand to "good as new" condition
- Tested, tried, proved in use
- Each installation individually engineered from preliminary design to operation by experienced Nichols engineers.

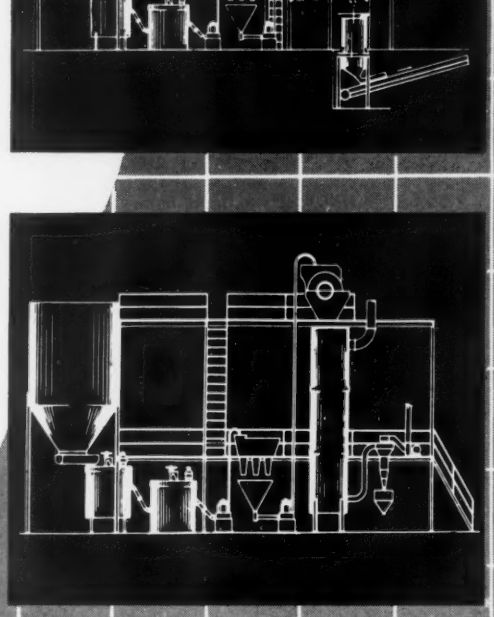
HIGH temperature burning

For complete removal of organic and other undesirable elements. Result is similar in appearance and quality to new sand, fit for use in molding, sand slinger, core making, core blowing, just as new sand.



LOW temperature drying

For reclaiming sand to be used as green sand facing or bulky green sand cores. Result is a sand with clay and fines removed, constant grain distribution.



Write for Bulletin No. 222

NICHOLS Engineering & Research Corp.

70 PINE ST., NEW YORK 5, N. Y.

1637 N. Illinois St., Indianapolis 2, Ind.
40 S. Los Robles Ave., Pasadena 1, Calif.
1477 Sherbrooke St. W., Montreal 25, Canada

Have the "TOUCH OF GOLD" when you grind steel castings

Rely on Norton ALUNDUM* wheels

The right Norton wheel on the job gives you the "Touch of Gold" . . . that sense of adding value to the product every time the wheel turns . . . and adding to your own profit by doing the job the fastest, most efficient way.

Whether you use swing frame, floor stand, or portable grinders to rough-grind your steel castings, there's a Norton ALUNDUM wheel that's right for the job.

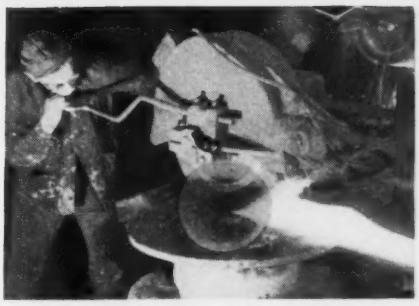
Get help in selection from your Norton distributor and abrasive engineer. Get the right answer for such variables as: the condition and type of the casting . . . area of wheel contact . . . amount of pressure applied and heat generated . . . . type of grinding machine used.

And, you'll find out which ALUNDUM abrasive to use for your cleaning room jobs and which of the several outstanding Norton bonds (BH, R5 and B7 resinoid for high speeds and BE for slow speeds) to use for best results.

Free 48-page booklet, "Rough Grinding," fully illustrated. Ask your nearby Norton Distributor for Form 1405 or write us direct. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

NORTON
ABRASIVES
Making better products to make other products better

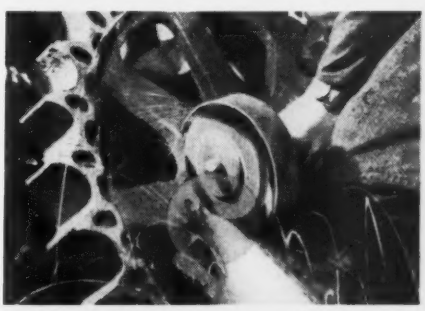
*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



Be sure of fast cutting action . . . without sacrificing wheel life from Norton ALUNDUM wheels with resinoid bonds. They give you the "Touch of Gold."

Get twice the efficiency from your floor or bench grinders by using Norton ALUNDUM wheels on both ends of your machines.

Snag steel castings with portable grinding machines, using fast-cutting Norton ALUNDUM wheels.



You get the "Touch of Gold" when you use Norton wheels. Shown here, Norton ALUNDUM wheel grinding a sprocket at a fast rate.

Step up rate of stock removal from steel castings by use of pressure bar on floor stand grinders . . . keep handling time to a minimum.

SAFEGUARD YOUR PERSONNEL and your PROPERTY!

Eliminate dangerous gases, fumes and dust with a MULTI-WASH collector

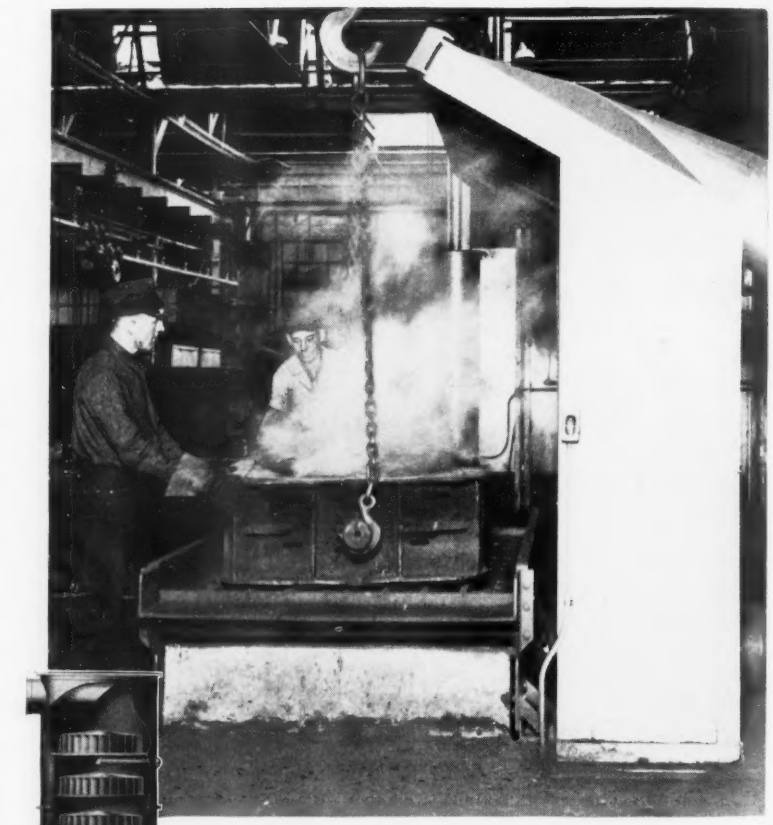
It will pay you to consider the many advantages of a Multi-Wash dust collecting system.

With Multi-Wash you won't have to dig yourself out of accumulated dust particles and furthermore you'll eliminate the danger of a spontaneous fire. Personnel too, will find conditions more agreeable and production will increase, because the cause of sick leave due to ailments attributable to dust and fumes will be substantially eliminated.

You can start in a small way to clean up objectionable dust and fumes by installing a Multi-Wash unit in the most offensive area first. Later, you can add on as conditions warrant.

From a dollars and cents approach you'll be far ahead with Multi-Wash both production-wise and maintenance-wise.

Be wise, contact your local Schneible representative or write direct for a further study of your dust and fume problem.



MULTI-WASH

MULTIPLIES WASHING FOR TOP EFFICIENCY

CLAUDE B. SCHNEIBLE CO.

P. O. Box 81, North End Station
Detroit 2, Michigan

PRODUCTS:

Multi-Wash Collectors • Uni-Flo Standard Hoods • Uni-Flo Compensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrap • Dust Separators • Entrainment Separators • Settling and Dewatering Tanks • "Wear Proof" Centrifugal Slurry Pumps

SCHNEIBLE

Late Foundry News

November 24, 1953

ALUMINUM RECORD: Shipments of aluminum to manufacturers of end-products, foundries and other consumers are expected to reach an all-time peak of 1,700,000 tons this year, according to the BDSA, Department of Commerce. This is about 350,000 tons more than the 1952 total and does not include shipments to the national stockpile. The gain results from greater civilian use, shipments for military programs showing a slight dip.

Under the Defense Materials System 97,000 tons of aluminum will be set aside in the first quarter of 1954 to fill Department of Defense and Atomic Energy Commission orders. This is 20,500 tons less than the current quarter set-aside and represents 24 per cent of the anticipated supply of primary aluminum.

SCRAP TIGHTER: Reports indicate a stronger market developing for ferrous scrap in the Pacific Northwest. Supplies are said to be coming out more slowly, partly in anticipation of a higher market for export scrap. According to one foundry in that area, sellers have boosted the price of cast scrap $6 a ton. In major scrap consuming centers elsewhere, cast and steelmaking grades are bringing about $2 a ton above the market a month ago.

NEW FOUNDRIES: Gleason Works Inc., Rochester, N. Y., is planning construction of a new, highly mechanized foundry in that city. It is expected to cost several million dollars. Badger Meter Mfg. Co., Milwaukee, will build a new plant costing about $400,000 in Fall River, Wis., for the production of brass castings and forgings and zinc die castings.

NON-FERROUS FOUNDERS: Directors of the Non-Ferrous Founders' Society recently selected a carrier for an association-wide accident, health, hospitalization and life insurance plan. It will give the small foundry the benefit of a large-volume program, as well as a fairly substantial saving to the larger foundries. The society also is planning a survey of production potential of its members for government and industry use.

QUALITY CONTROL: A book intended to aid plants in setting up quality control programs is available from the Office of Technical Services, Department of Commerce, Washington 25. Entitled *Statistical Quality Control and Acceptance Sampling*, it includes 103 pages with tables and charts and costs $2. Checks should be made payable to the Treasurer of the United States.

SELLS INTEREST: Samuel Frankel has sold his interest in Foundry Services Inc., New York, and has resigned as president and director. Herbert A. Frankel has resigned as secretary and director. Both men have been retained by Foundry Services Inc. in a consulting capacity.

BREAKS GROUND: At a ceremony in Des Plaines, Ill., on Nov. 17 the American Foundrymen's Society broke ground for its new national headquarters building. AFS President Collins L. Carter presided. Construction is proceeding, with completion scheduled for 1954.

SMALL BUSINESS LOANS: Loan applications from business firms regardless of type will be considered, the federal Small Business Agency has announced. Previously loans were limited to companies whose production was essential to defense. A more liberal policy on direct loans also is indicated. Heretofore private lenders were encouraged to make the loans, with government participation held to a minimum. This policy is to continue but with more direct lending by SBA.

OVERHAUL: The Interstate Commerce Commission is looking into the consolidation of bureaus that are now overlapping in the transportation field. The ICC has jurisdiction in interstate operations of about 1000 railroads, 21,000 motor carriers, 75 pipelines, 50 electric railways, 300 water carriers, 110 private carlines, 100 freight forwarding companies, plus one Pullman company and one express company.

PUSH APPRENTICE TRAINING: A three-months' drive to stimulate apprentice training activities in the foundry industry will be launched in January by the Bureau of Apprenticeship, U. S. Department of Labor. Objectives are: To stimulate training activities; to improve the quality of training; to obtain information about the need for training and what progress is being made.

AFS CONTEST: Annual apprentice contest of the American Foundrymen's Society—its 31st—has been announced. It will close Mar. 15 and

national judging will take place in Chicago about Apr. 1. Prizes of $100, $50 and $25 will be given in each of five divisions: Gray iron molding, steel molding, nonferrous molding (light and heavy alloys), wood patternmaking and metal patternmaking. First-place winners also will receive railway fare to attend the AFS convention in Cleveland, May 8-14.

PERSONALS: Joseph Abusamra, assistant to the president, Arcade Malleable Iron Co., Worcester, Mass., has joined Belcher Malleable Iron Co., Easton, Mass., as vice president and general manager . . . Otto W. Winter, president, Winter Engineering Co., will head a newly formed shell mold department of Beardsley & Piper Division of Pettibone Mulliken Corp., Chicago . . . Fred N. Eaton, recently Foundry Division manager for Bohn Aluminum & Brass Corp., has been appointed works manager, Foundry Division, Aluminum Industries Inc., Cincinnati.

OBITUARIES: William C. Stevenson, until recently executive vice president, Hickman, Williams & Co., died in Cleveland, Nov. 5 . . . E. G. Fauntleroy, vice president, Moline Malleable Iron Co., St. Charles, Ill., died in Chicago, Nov. 17 . . . Jack O. Felt, New York, public relations counsel for the Steel Founders' Society of America, died Nov. 14 . . . Carl F. Clarke, formerly president, Monroe Steel Castings Co., Monroe, Mich., died Nov. 16 . . . William P. McGervey, president, Hanford Foundry Co., San Bernardino, Calif., died Nov. 14.

MISCELLANY: Allis-Chalmers Mfg. Co. has taken over operation of the Buda Co., Harvey, Ill. The latter will be known as a division of Allis-Chalmers . . . Rockwell Mfg. Co., Pittsburgh, has bought the Callander Foundry & Mfg. Co., Guelph, Ont., manufacturer of power tools and electrical conduit fittings . . . An all-time peak in both dollar expenditures and physical volume will be established by the construction industry this year. Indicated gain over 1952 is 6 per cent . . . Zirconium Corp. of America has been formed with plant and offices at Solon, O., to manufacture various zirconium compounds.

PRICES OF FOUNDRY METALS AND COKE

(As of Nov. 24, 1953)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50-17.00
OVEN	
Birmingham	$22.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	26.00
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
New Haven, Conn.	23.45
Painesville, O.	25.50
Philadelphia	23.95
Portsmouth, O.	24.00
St. Louis	26.00
St. Paul	23.75
Swedeland, Pa.	23.85
Terre Haute, Ind.	24.05

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	63.00	63.50
Fontana, Calif.	62.50	....
Geneva, Utah	56.50	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	58.50	59.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	....	56.50

NONFERROUS INGOT

BRASS AND BRONZE: Red brass, No. 115, 24.50; tin bronze, No. 225, 25.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

ALUMINUM: 99 per cent plus, primary ingots 21.50c. Secondary No. 12 alloy 20.25-21.25. Deoxidizing grades: No. 1 21.50-22.00; No. 4 17.50-18.50.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 29.50-30.00c, Connecticut valley.

ZINC: High grade 11.35c, delivered. Die casting alloy 14.50c, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

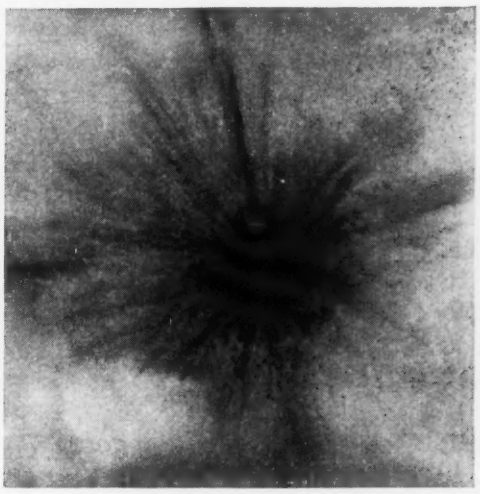
	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$26.00–26.50	**$41.00–42.50	**$30.00–31.00	.....	.....	.....	$42.00–43.00
Boston*	**25.00–26.00	**29.00–30.00	.....	.....	**36.00–37.00	.....	.....
Buffalo	34.00–35.00	**34.00–35.00	.....	.....	**39.00–40.00	.....	46.00–47.00
Chicago	33.00–34.00	34.00–35.00	.....	38.00–40.00	38.00–40.00	40.00–41.00	46.00–50.00
Cincinnati*	**32.00–33.00	**38.00	**35.00	.....	**46.00	**42.00–43.00	48.00–49.00
Cleveland	33.00–34.00	43.00–44.00	27.00–28.00	46.00–47.00	46.00–47.00	45.00–46.00	50.00–51.00
Detroit*	**29.00	**40.00	**29.00–30.00	**40.00	.....	**40.00	.....
Los Angeles	23.00	**40.00–41.00	.....	.....	.....	.....	.....
New York*	27.00–28.00	29.00–30.00	.....	.....	.....	.....	.....
Philadelphia	35.00	35.00–36.00	40.00	.....	42.00–43.00	.....	.....
Pittsburgh	36.00–37.00	35.00–36.00	40.00	.....	46.00–47.00	.....	49.00–51.00
St. Louis*	33.00	38.00–39.00	31.00–32.00	39.00–40.00	.....	37.00–38.00	47.00–48.00
San Francisco	23.00	39.00	36.00	39.00	43.00	.....	.....
Seattle	31.00	**30.00–35.00	**25.00–30.00	.....	.....	.....	.....

*Brokers' buying prices. ** F.o.b. shipping point.

HYGEIA

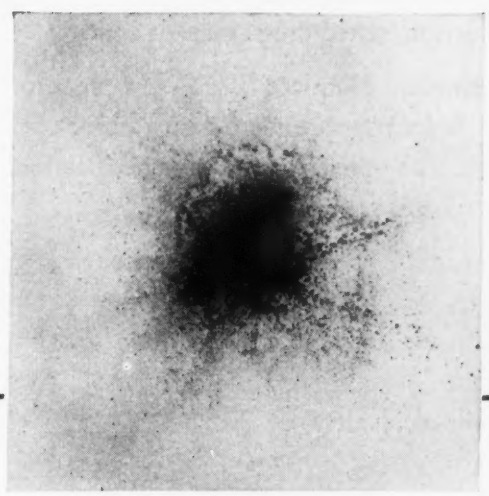
MAKE YOUR FOUNDRY A BETTER PLACE IN WHICH TO WORK

HYGEIA PITCH AND HYGEIA SEACOAL



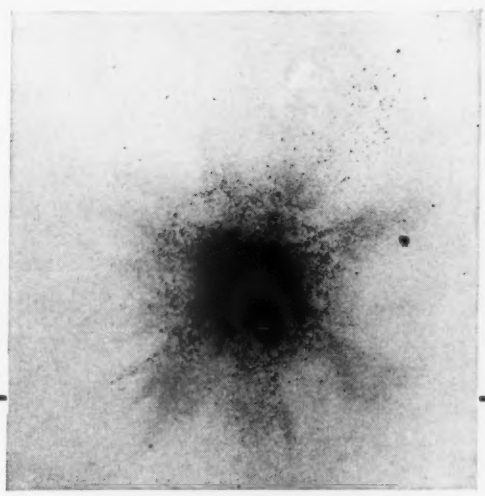
Drop Test Scatter Pattern
of Regular Grind Pitch

Drop Test Scatter Pattern
of Regular Grind Seacoal



Drop Test Scatter Pattern
of Regular Grind *Hygeia* Pitch

Dust count using impinger method showed *400* particles of regular pitch were airborne to *1* of hygeia pitch



Drop Test Scatter Pattern
of Regular Grind *Hygeia* Seacoal

Dust count using impinger method showed *800* particles of regular seacoal were airborne to *1* of hygeia seacoal

SOME POSITIVE ADVANTAGES

1—Permanently dust-free
2—Cleaner handling
3—Less material lost
4—Minimizes fire hazard
5—Improved flowability
6—Safer working conditions
7—Blends easier with sand
8—Better shakeout
9—More economical
10—Cleaner Foundry

You owe it to yourself to investigate our claims. Write for further details.

PENN-RILLTON COMPANY

324 West 23rd Street, New York 11, N. Y.

Knight Services Include:

Foundry Engineering

Survey of Facilities

Architectural Engineering

Construction Management

Modernization

Mechanization

Automation

Materials Handling

Production Control

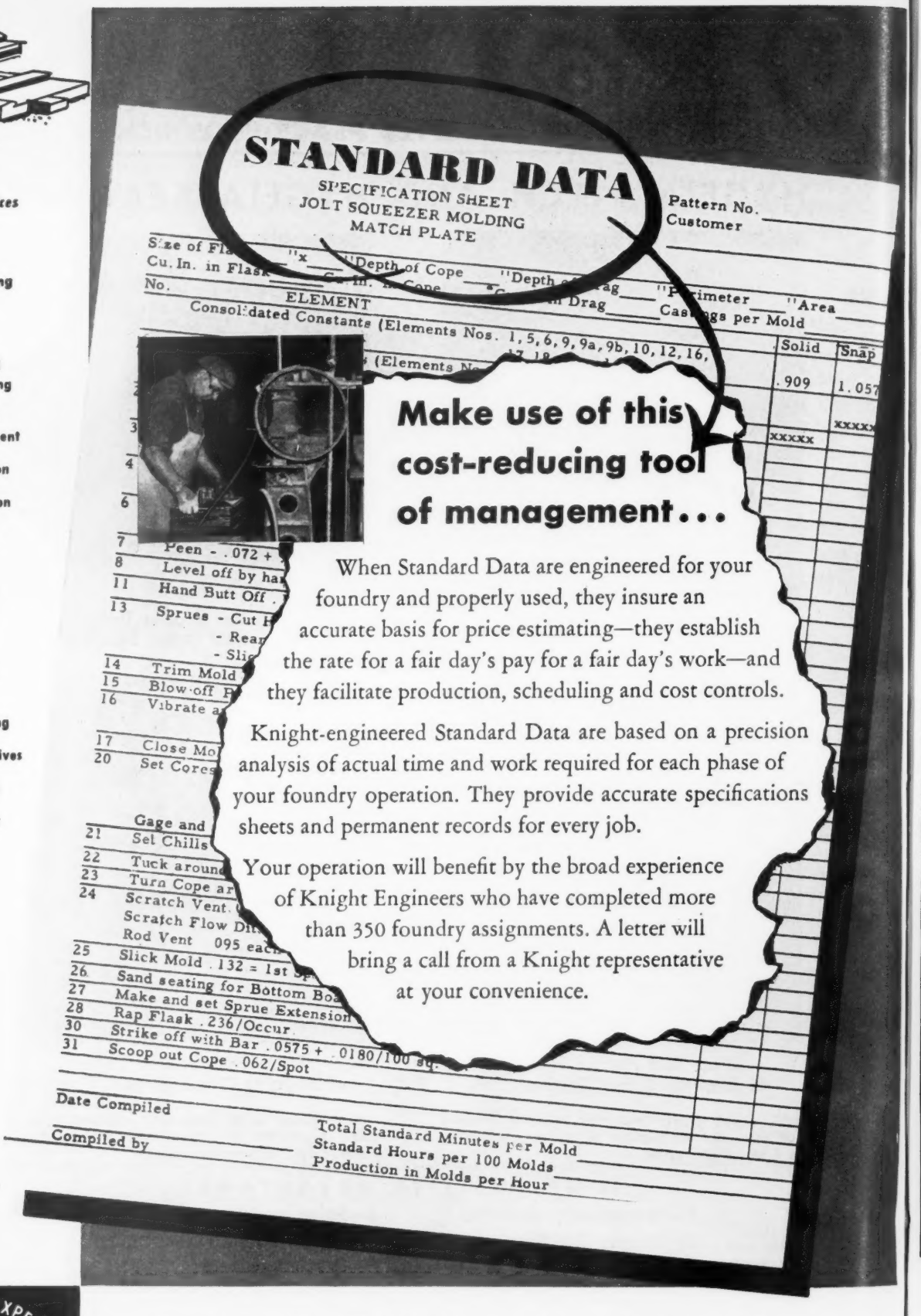
Cost Control

Industrial Engineering

Wage Incentives

Organization

Management



Make use of this cost-reducing tool of management...

When Standard Data are engineered for your foundry and properly used, they insure an accurate basis for price estimating—they establish the rate for a fair day's pay for a fair day's work—and they facilitate production, scheduling and cost controls.

Knight-engineered Standard Data are based on a precision analysis of actual time and work required for each phase of your foundry operation. They provide accurate specifications sheets and permanent records for every job.

Your operation will benefit by the broad experience of Knight Engineers who have completed more than 350 foundry assignments. A letter will bring a call from a Knight representative at your convenience.

EVIDENCE OF EXPERIENCE

Lester B. Knight & Associates, Inc.

Consulting Engineers

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC

600 W. Jackson Blvd., Chicago 6

917 Fifteenth St., N. W., Washington 5, D. C. • Lester B. Knight & Associates, 50 Church St., New York 7

Hundreds of hours longer...

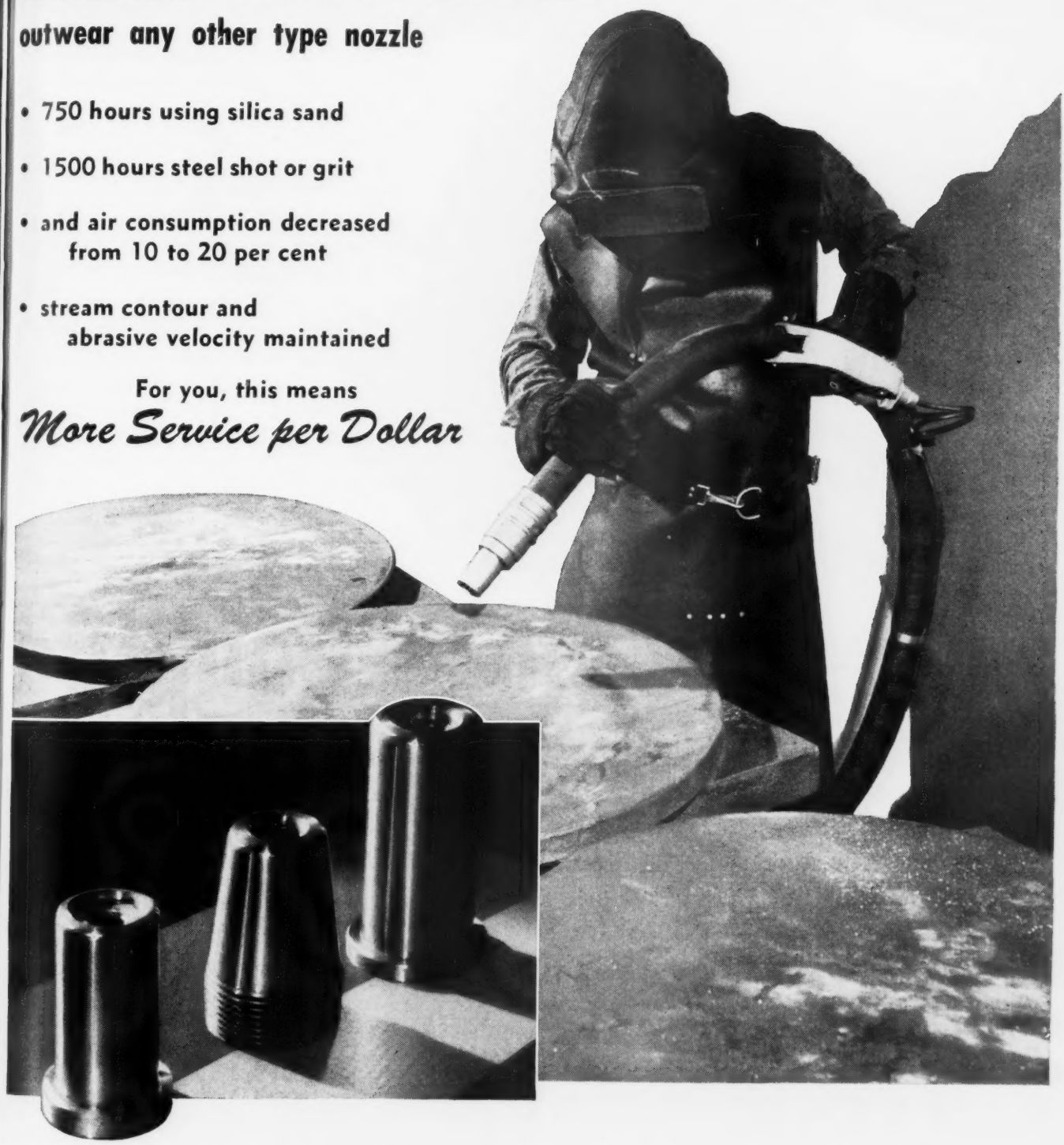
NORBIDE® Pressure Blast Nozzles

outwear any other type nozzle

- 750 hours using silica sand
- 1500 hours steel shot or grit
- and air consumption decreased from 10 to 20 per cent
- stream contour and abrasive velocity maintained

For you, this means

More Service per Dollar



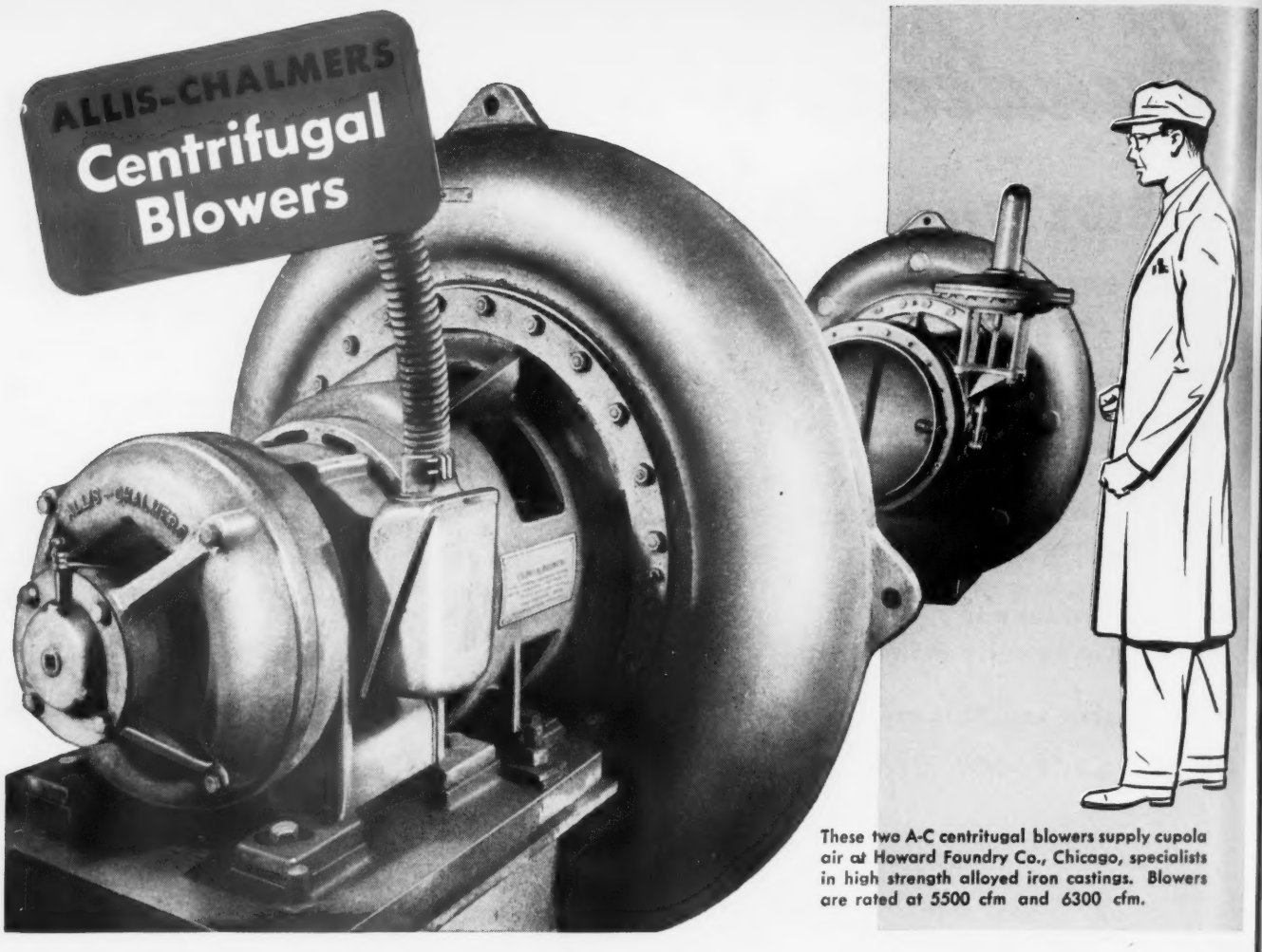
Only the diamond is harder than Norbide

NORTON®

NORTON COMPANY

WORCESTER 6, MASSACHUSETTS

Making better products to make other products better



These two A-C centrifugal blowers supply cupola air at Howard Foundry Co., Chicago, specialists in high strength alloyed iron castings. Blowers are rated at 5500 cfm and 6300 cfm.

Compact, Close-Coupled

★ Close-coupled Allis-Chalmers blower design reduces space requirement.

★ Low noise level, long-lived cast iron casing.

★ Anti-friction bearings support the impeller and motor rotor, the only moving parts.

VITAL RELIABILITY in cupola operation is assured with Allis-Chalmers centrifugal blowers. Cupola operation is especially critical at the Howard Foundry Company since the component elements in production of malleable iron demand precise control.

A cast iron casing in Allis-Chalmers blowers reduces vibration, lowers noise level, and assures long life. With the impeller "overhung" on the motor shaft and supported by anti-friction bearings, the installation is compact and readily accessible.

The constant air weight control on the blower inlet automatically delivers more or less air, as required, without the necessity of blowing off to atmosphere and wasting power.

For more information call your nearest A-C sales office or write to Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 16B6048B. A-3838

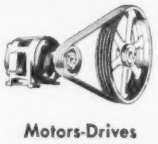
Foundromatic and *Regulex* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Foundry Equipment for Bigger Output—Better Working Conditions!

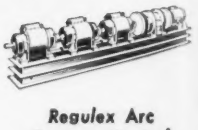
Foundromatic Shakeouts



Motors-Drives Control

Foundromatic Core Dryer

Induction Heating & Melting



Regulex Arc Furnace Control

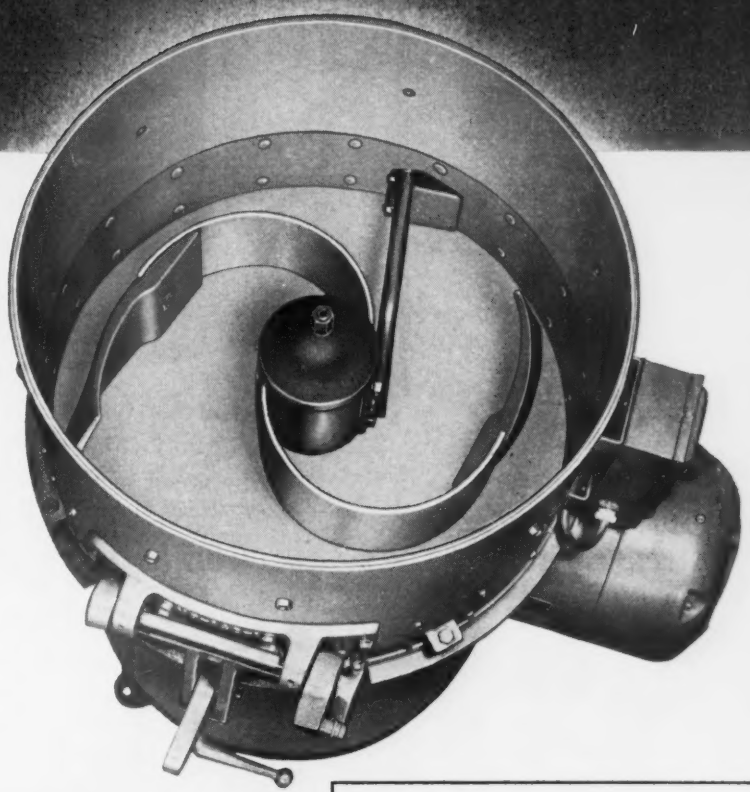
WHIRLMIX RUBBING ACTION PROTECTS SAND AS IT MIXES

• More thorough mixing *without* crushing or heating—more sand mixed per hour at lower cost—these are the big advantages provided by WHIRLMIX sand mixers.

Flexible, spring steel, whirling arms rub and squeeze sand with a regulated pressure that compensates for any variation in the amount of sand being mixed. *Correct* mixing pressure is always assured, to prevent the crushing or heating of sand grains. This exclusive mixing action produces a fluffy, well-aerated sand mixture. Because sand grains are not crushed, permeability can be maintained. Because sand is not heated, moisture can be controlled. And, because mixing is extremely thorough, a *minimum* amount of oil or cereal binders will produce maximum bond.

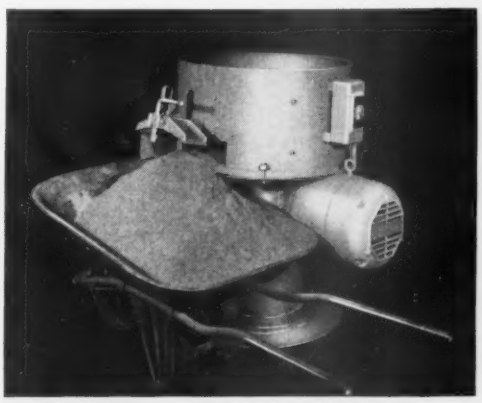
The whirling arms whirl sand from center to sides of the mixer, where the rubbing action takes place. Sand is firmly squeezed and rubbed between the rubbing shoes and mixer wall. Sand is squeezed upwards until it falls back into center of pan, where it is again picked up by the whirling arms to go through another mixing cycle.

WHIRLMIX mixers are easy and economical to maintain. Lower inner wall is tough, wear-resistant, synthetic rubber—bottom plate and rubbing shoes are long-wearing, high carbon steel—easily replaceable when necessary. WHIRLMIX mixers occupy little floor space, do not require foundations and are easily moved by crane or lift truck.



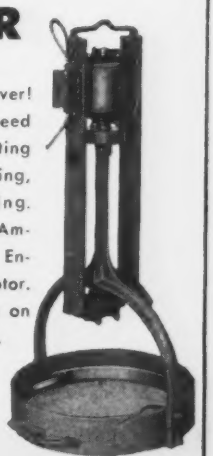
	BATCH SIZE		
	Core Oil Sand	Facing Sand	Dry Core Comp.
. Model	15 lbs.	10 lbs.	10 lbs.
100	100 lbs.	60 lbs.	60 lbs.
300	300 lbs.	200 lbs.	200 lbs.
600	600 lbs.	400 lbs.	400 lbs.
X TIME	3 min.	1½ min.	1½ min.

A new, 4-page, illustrated bulletin gives full particulars and specifications on all four models. Write for a copy for your file.



Discharge door, in models 300 and 600, is 28" above floor—high enough to accommodate a 3 cubic foot wheelbarrow.

FEDERAL'S LOWE SIFTER



Here's another money saver! An inexpensive, high-speed sifter with rotating-vibrating action . . . for faster sifting, better sand conditioning. Large, removable screen. Ample shovel clearance. Enclosed ball bearing motor. Write for complete data on the three popular models.

FEDERAL

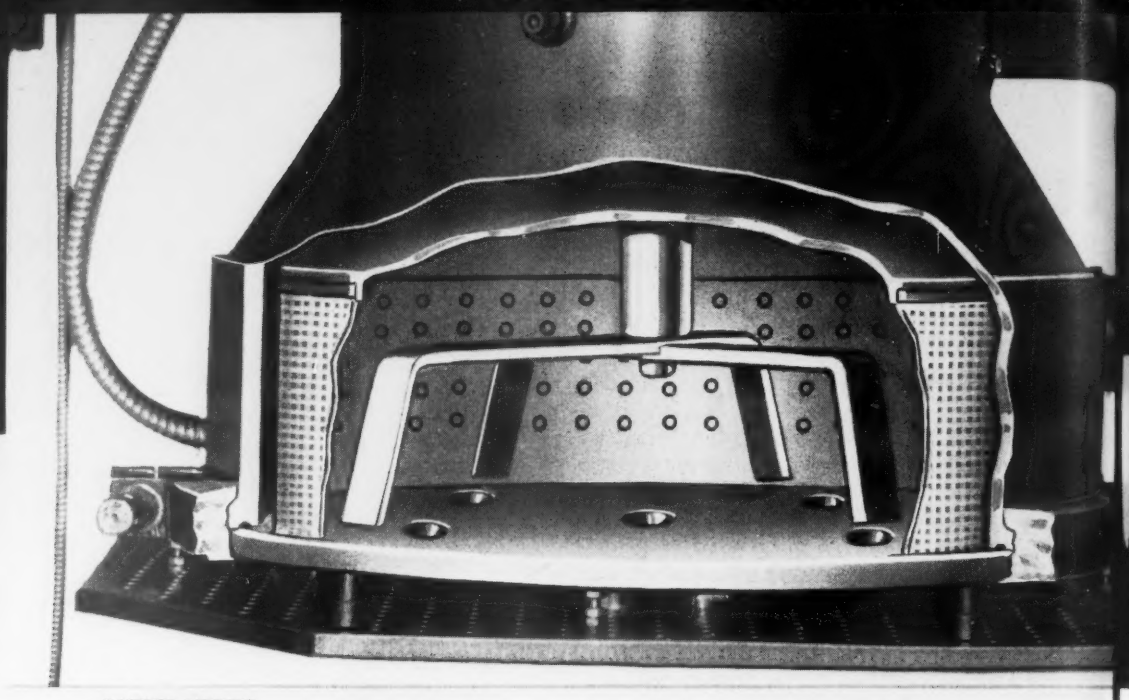
The FEDERAL FOUNDRY SUPPLY Company

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK

only SAN-BLO ha

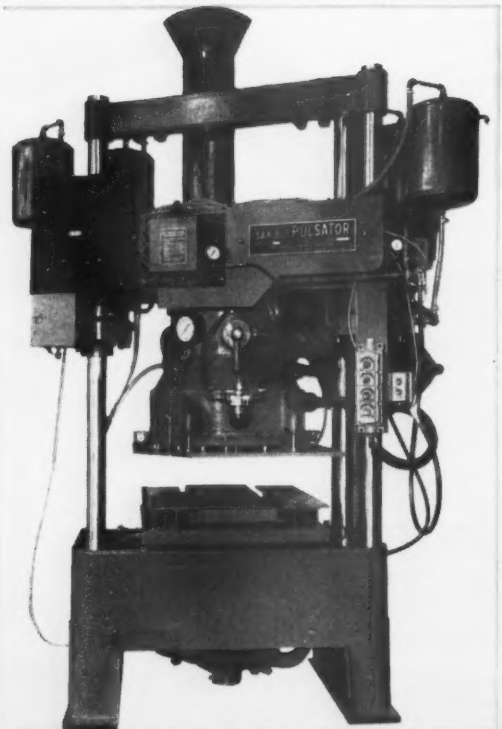
MOTOR-DRIVEN PLOW



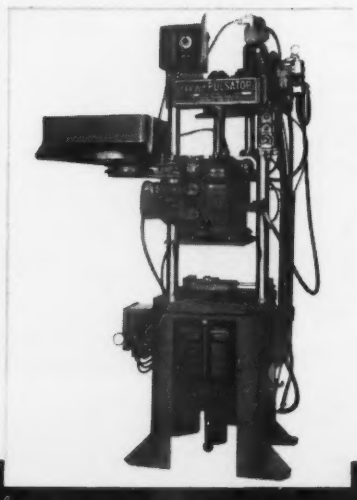
PATENTS PENDING

There's no other core blower like the SAN-BLO! There's no other core blower to equal the SAN-BLO's amazingly successful performance! Because *only* SAN-BLO has motor-driven plows and aerating air circuit to provide "mechanical-aerating action" for moving sand from sand magazine to core box.

In the above cut-away photo of the SAN BLO's *round* sand magazine you'll see the motor-driven plows that move sand toward the blowholes during the blowing cycle. The plows are positioned to provide thorough agitation of the sand to keep the blowholes covered with sand at all times. As a result, there are no "dead spots"—no "piping", no "channeling" of sand in the magazine—never a condition where "all air and no sand" is blown into the core box.



Model 250P-LPP, with "Pulsator" and "LPP". Blows cores weighing up to 250 lbs. in metal or wooden core boxes. Hydraulic elevator, with automatic safety lock, for raising and lowering sand magazine. Electronic controls, with single push-button operation, for automatic clamping, blowing and drawing of cores, and refilling of sand magazine. Roller conveyor available for large core boxes. For further information write for Bulletin No. CB-7.



Model 40-PI-LPP, with "Pulsator" and "LPP". Blows cores weighing up to 40 lbs. in metal or wooden boxes. Sand magazine refilled manually by swinging it under hopper which is filled from floor. 6" stroke clamp-draw table. Single button control. For further information, write for Bulletin No. P-3.

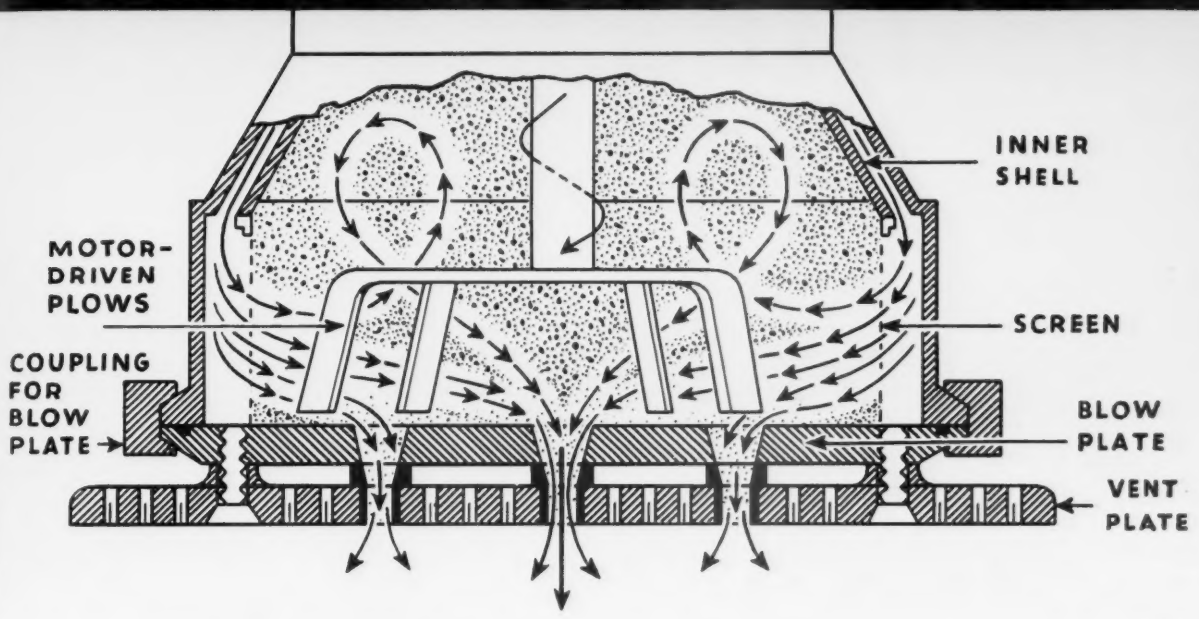
AND ONLY SAN-BL PROVIDES "PULSATION AND "LPP"

"Pulsator" model SAN-BLO machines div the blowing cycle into a few short, qu blows instead of one continuous bl This keeps air pressure within the core extremely low—permits blowing woo core boxes *safely!*

SAN-BLO machines with "LPP" (low p sure prefill) use low air pressure to fill boxes and then full line pressure to the sand. Pre-filling with low pres *minimizes* core box wear, in both woo and metal boxes!

...hanechanical-aerating action!

AERATING AIR CIRCUIT



This cross-section drawing of the sand magazine shows how the SAN-BLO's aerating air circuit works along with the plows to carry sand into the core box. Note that the air is directed down the sides of the magazine, between inner shell and outer wall, then enters the magazine through a fine mesh screen. As it enters through the screen, the air is broken up into thousands of tiny air streams that aerate and fluff-up the sand as it is moved toward the blowholes by the plows. Sand in the lower section of the magazine is constantly being agitated and aerated during the blowing cycle—until it becomes an extremely flowable, air-sand mixture which is easily and quickly *carried* by the air stream into the core box. This mechanical-aerating action is an absolute requisite for successful core blowing—and *only* SAN-BLO has it!

HERE'S WHAT SAN-BLO ADVANTAGES CAN MEAN TO *YOUR* CORE ROOM:

With the SAN-BLO you can blow *all* your present core sand mixtures—or any other mixture you can hand-ram. Green sand cores made from molding sand are blown as readily as oil sand cores. You can forget close sand control—forget your concern over flowability. Green bond strength can run as high as 12 p.s.i.—moisture up to 8%. In many cases, you can do away with core rods and wires. You won't lose time changing sand magazine, for the SAN-BLO uses but one standard sand magazine, which is never changed. Adjustment is simple and fast—you change from box to box in a matter of seconds.

Therefore, the SAN-BLO is ideal for short runs, as well as long runs. You can safely blow wooden boxes (properly constructed) as well as metal boxes. And wear in both wooden and metal boxes is held to a minimum. There are only *two* SAN-BLO model sizes, for blowing cores weighing from a few ounces to 250 lbs. each. The "40" model blows the entire range from a few ounces to 40-lb. cores—the "250" from 5 to 250-lb. cores, Here, then, is the core blower for you—the all-purpose core blower for both jobbing and production foundries!

You'll blow more cores, better cores, at lower cost—with a SAN-BLO!

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK

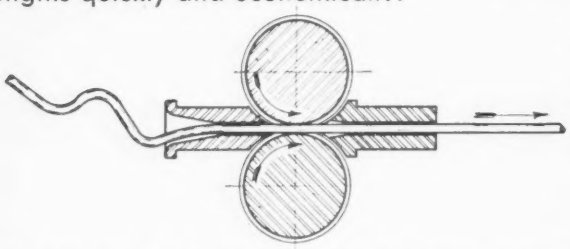
IN FRANCE—SA. PH. BONVILLAIN & E. RONCERAY, Rue Paul-Carle a Choisy-Le-Roi, Seine

MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC.

CLIMAX
WIRE STRAIGHTENERS

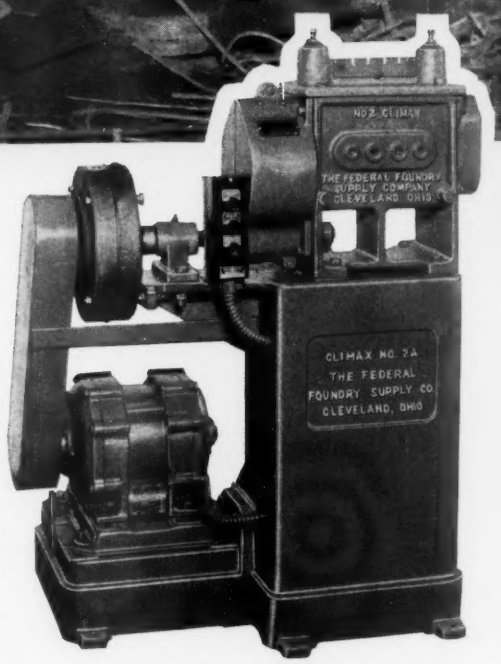
FOR MORE THAN FORTY YEARS, THE INDUSTRY'S MOST RELIABLE STRAIGHTENERS OF WIRE AND ROD

Reclaim your used core rods and wires and save money—with the CLIMAX. Operated safely and efficiently by unskilled labor. Straightens random lengths quickly and economically.



Bent wire is first checked in guide slots at top of the machine to determine proper feed hole, then inserted in feed hole, straightened between two heavy, alloy steel rolls under spring tension and ejected at back with a slight, natural bend, just right for core rod use.

Safety for the operator, as well as long life for the machine, is insured by enclosing gears and other moving parts. On motorized units, V-belts are enclosed and electrical wiring protected. Conveniently mounted controls and a reversible magnetic switch provide full protection for operator and straightening rolls, by enabling operator to stop or reverse machine instantly.


NO. 2 CLIMAX
THE FEDERAL FOUNDRY SUPPLY COMPANY CLEVELAND, OHIO
CLIMAX NO. 2A
THE FEDERAL FOUNDRY SUPPLY CO.
CLEVELAND, OHIO

MODEL 2A
motorized

Handles 4 wire sizes, 1/16" to 1/4". A complete unit, ready for operation when connected to current supply.

MODELS AVAILABLE

The CLIMAX is offered in three sizes: to handle 4 wire sizes from 1/16" to 1/4"—4 sizes from 3/16" to 1/2"—and 5 sizes from 1/4" to 3/4". Each size may be furnished in three styles, as follows:

(1) Completely motorized—ready to operate.
(2) With gear reduction unit for your motor.
(3) With extended shaft for your own drive.

Write for additional information and prices, specifying wire sizes and model style.

FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. · CHICAGO · CHATTANOOGA · DETROIT · MILWAUKEE · NEW YORK · RICHMOND · LOS ANGELES · UPTON, WYO.

Foster Machine Company reports:

Up to 50% lower costs through shell molding

various textile machine parts

using

MONSANTO'S RESINOX 736 RESIN

Truer, cleaner castings produced from shell molds bonded with Resinox 736 resin resulted in over-all savings of 15% on this textile machine part, cast by Shell Process, Inc., Chicopee, Mass. for the Foster Machine Co., Westfield, Mass. Savings up to 50% are being realized on other parts now being shell molded for Foster.

How does shell molding cut costs? From their experience, Foster reports . . . "partly from less hand and machine finishing than required with conventional casting methods; partly from faster rig-up time."

For the user, shell molding in practice delivers castings with surface finish *superior* to that of any similar casting made in a sand mold. This means large savings on clean-up . . . in some cases a 100% reduction! Castings, too, are produced to closer tolerances, with good detail on intricate shapes and thin sections.

In the foundry, shell molding usually increases productivity over other casting methods . . . permits a more compact, efficient operation . . . greater production per man hour with unskilled help. Other gains: increased metal yield, less sand handling, cleaning and grinding.

Monsanto will be glad to tell you more about the cost-saving advantages of shell molding . . . and the particular advantages of Monsanto resins for the foundry. For example, where stiffer shells are a "must," Resinox 736-A resin might be your answer. In addition to resins for shell molding, Monsanto produces phenolic and urea resins for core binding, and Lytron sand conditioner for conventional sand casting. For full information, mail the handy coupon today.

Resinox, Lytron: Reg. U. S. Pat. Off.

MONSANTO

SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY,
Plastics Division, Room 5718,
Springfield 2, Mass.

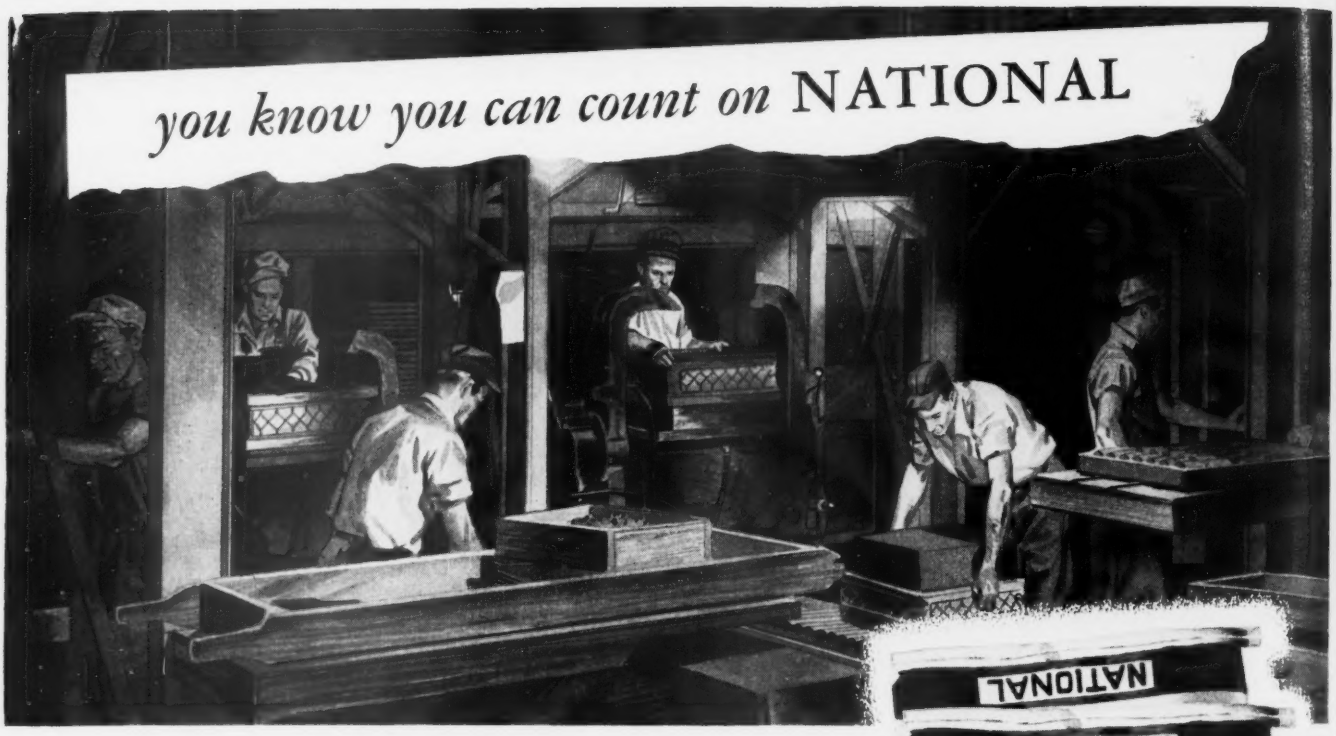
Please send me your booklet, "The Shell Molding Process."
Also, please send me information on: ☐ Monsanto resins for shell molding; ☐ Monsanto resins for core binding; ☐ Monsanto Lytron Sand Conditioner.

NAME & TITLE _____

COMPANY _____

ADDRESS _____

CITY, ZONE, STATE _____



NATIONAL BENTONITE

MEANS BETTER BONDED MOLDS AND FINER FINISHED CASTINGS

Many experienced foundrymen, like those pictured above, have depended on National Bentonite for better bonding of their molds. They know they can count on National's consistently uniform high quality, good green strength, high hot strength and many other characteristics which contribute to better bonded molds. For years they've found this means better production, with better castings requiring less time in the cleaning room.
You, too, can be sure of better bonds with NATIONAL BENTONITE.

FIRST CHOICE WITH MANY GOOD FOUNDRYMEN FOR YEARS

Baroid

Quick Service From Better Foundry Suppliers Everywhere

Baroid Sales Division ☆ National Lead Company

Bentonite Sales Office: Railway Exchange Building, Chicago 4, Illinois

FOR RUGGED LIFT!

USE STEARNS POWER PACKED LIFTING MAGNETS

Stearns Lifting Magnets have tremendous lifting capacity with built-in stamina to take rough handling.

Ruggedly built, powerful and efficient in operation, Stearns Lifting Magnets are the answer to material handling bottlenecks that waste valuable time and labor. Eliminate slings, straps and other methods of handling.

Simple one-man operation permits fast movement of large quantities of material — at a rock-bottom cost.

Take advantage of Stearns magnetic engineering experience. Use Stearns Lifting Magnets on castings, scrap, pig iron, rails, sprues, gates, etc. Available in bolted or all welded construction. Standard or special sizes to meet your requirements. Write today for complete information.

1015

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC.

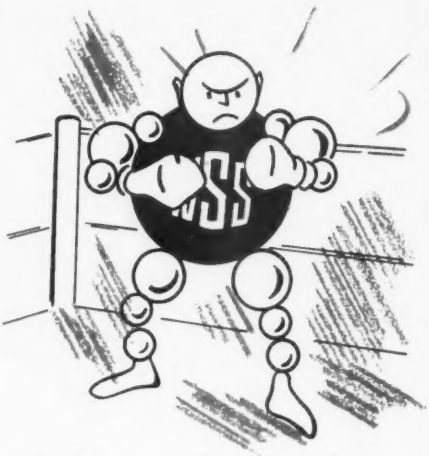
662 South 28th Street, Milwaukee 46, Wis.

only WHEELABRATOR

hardness for

FASTER CLEANING

The hardness of this super shot (42 to 50 Rockwell C) concentrates the impact of each pellet on the work so that sand and scale are quickly removed. This hardness is achieved by combining the strength of an electric furnace steel with a double heat treatment to produce a tempered martensite microstructure, the hardest and toughest iron carbon alloy.



toughness and solidity for

LONGER LIFE

The toughness and native impact strength of Wheelabrator Steel Shot considerably reduces shot consumption. All shot is round and solid . . . free from surface cracks. No conditioning is required and it stays round throughout its life. Because it lasts so much longer it lowers cleaning costs per ton.

rebound for

GREATER COVERAGE

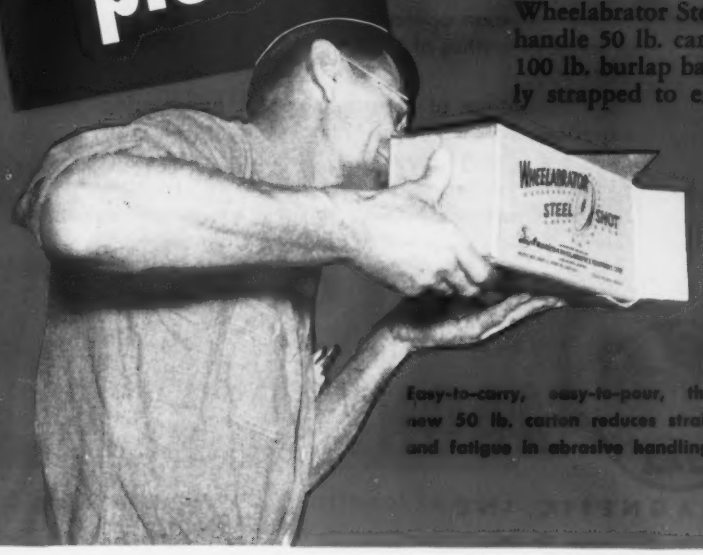
The unique rebound properties Wheelabrator Steel Shot cause to carom from part to part, penetrating and cleaning intricate cavities not reached by other abrasives. Rebounding on impact, does not lodge in the work and thus eliminates the problem of imbedment. In machining the parts, tool life is thereby greatly increased.

plus

50 LB. CARTONS and PALLETIZING

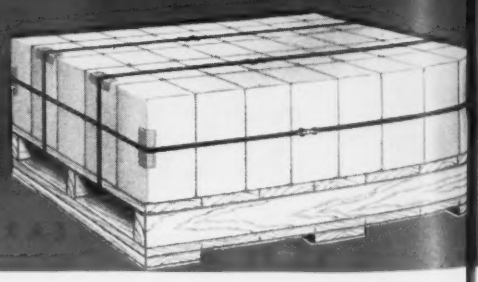
for safety—convenience—and lower cost to you

Wheelabrator Steel Shot is now packaged in strong, easy-to-handle 50 lb. cartons—more rugged than antiquated, heavy 100 lb. burlap bags. Shipments of 1 Ton or more are securely strapped to expendable pallets (40 cartons to a pallet) for safer transportation and easier handling and storage. This "Plus" savings is yours *at no extra cost!*



Easy-to-carry, easy-to-pour, this new 50 lb. carton reduces strain and fatigue in abrasive handling.

A Palletized 1 Ton Shipment

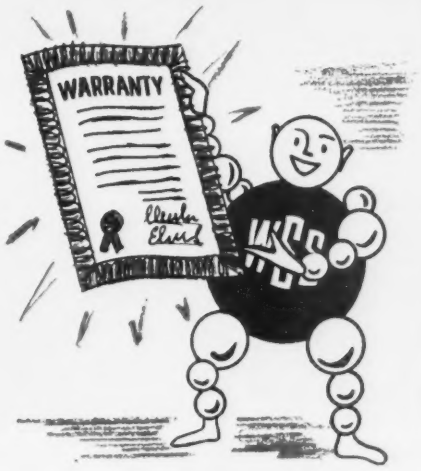


...TEEL SHOT *has all these advantages*

ways round for

...W MAINTENANCE

...e roundness of Wheelabrator ...el Shot drastically reduces wear ... replaceable parts and mainte... ...nce costs. It is round when ...aced into service and stays ...und throughout its life. This ...operty practically eliminates the ...arp edges that produce exces... ...e wear on cleaning equipment ..., minimizing down time, main... ...nance and parts costs.



warranted quality for

UNIFORM RESULTS

You get the same low-cost, highly effective cleaning performance from Wheelabrator Steel Shot every day of the week — every week of the year. There is no variance in quality from shipment to shipment as found with other abrasives. Uniformity of carbon content, hardness, microstructure and screen analysis is assured by the written warranty.

super performance for

LOWEST OVERALL CLEANING COSTS

Performance records in plants throughout the country and on every type of product prove convincingly that the lowest overall cleaning costs are achieved with Wheelabrator Steel Shot. Combining hardness with toughness, this superior shot will clean or peen faster, at lower cost, than any other abrasive. Try it and prove it for yourself.

plus

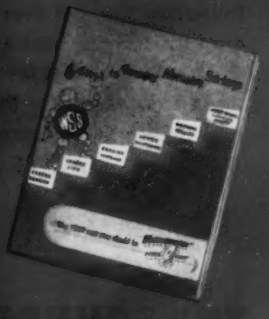
A SCHEDULED DELIVERY PLAN

that assures you the size and quality you need—when you need it

Pioneering Developments keep Wheelabrator Steel Shot First in Abrasives

Send for Bulletin 89A

Bulletin 89A tells the complete story about Wheelabrator Steel Shot and what it means to the user in terms of performance and economy. Write for your copy today.



THE AMERICAN MOLDER

American

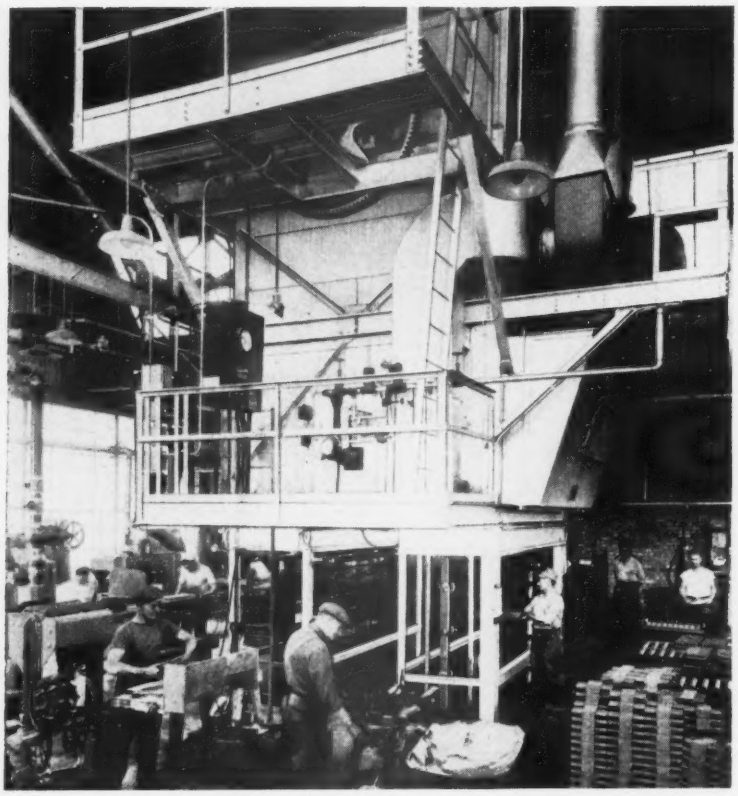
WHEELABRATOR & EQUIPMENT CORP.

505 S. Byrkit St., Mishawaka, Indiana

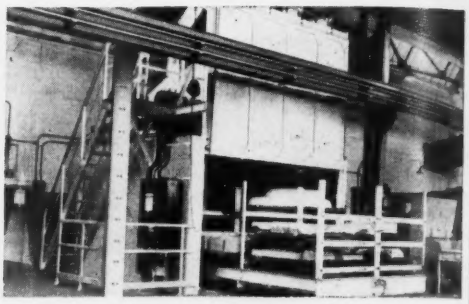
Repeat orders for

COLEMAN OVENS

prove outstanding performance



Coleman Tower Oven at Wells Manufacturing Co.



Coleman Car-Type Core Ovens
at Pettibone-Mulliken Co.

Coleman Car-Type Mold Oven
at The Bullard Co.

Battery of Coleman Transrack Core Ovens
at The Crucible Steel Castings Co.

You should get all the facts concerning the core and mold ovens you expect to install... because the right ovens will increase your production and your profits. Over 80% of Coleman Ovens are "repeat orders" from past customers... proving performance to *complete satisfaction.* Coleman Ovens are the choice of leading firms in every branch of the foundry industry from small shops to large production foundries. You get over 50 years of know-how and experience in every Coleman Oven, so why gamble with inferior designs? Coleman Ovens of proved performance cost no more... and pay for themselves quickly out of savings in fuel, labor and increased production. Get the facts today...

WRITE FOR BULLETIN C

A COMPLETE RANGE OF TYPES AND SIZES
for every core baking and mold drying requirement:

- Tower Ovens
- Horizontal Conveyor Ovens
- Car-Type Ovens
- Transrack Ovens
- Rolling Drawer Ovens
- Portable Core Ovens
- Portable Mold Dryers

THE FOUNDRY EQUIPMENT COMPANY
1831 COLUMBUS ROAD CLEVELAND 13, OHIO

● *world's oldest and largest foundry oven specialists*

Power-Packed for Profit...

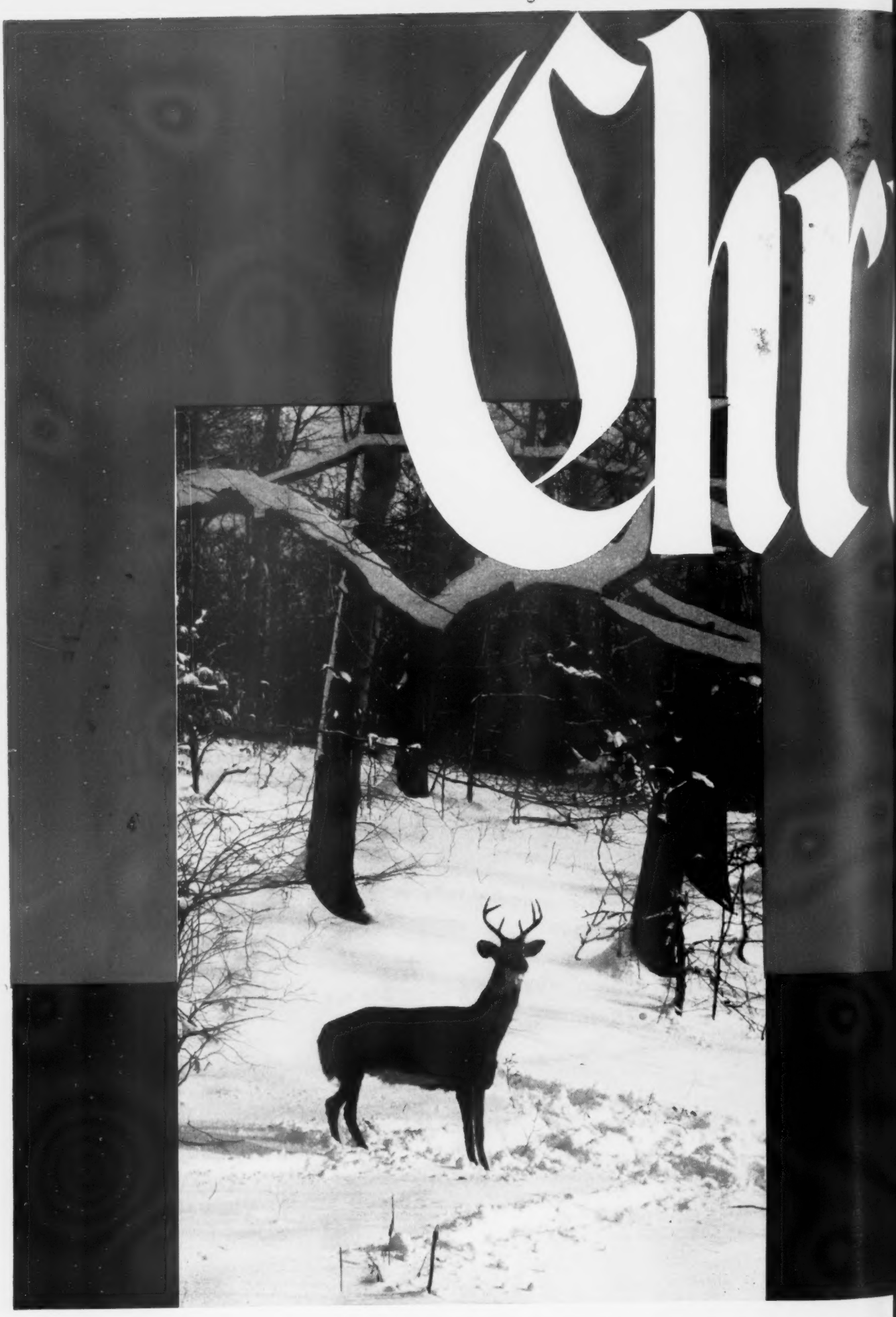
SHOT OR GRIT . . . that's Malleabrasive. Malleabrasive is scientifically heat-treated and laboratory controlled to clean *better, faster,* and last *longer.* Malleabrasive cleans *cheaper* because you save on parts repair and down-time . . . because its long life cuts abrasive purchases. Don't take our word for it. Prove it to yourself. Next time you buy blast cleaning abrasive, specify Malleabrasive from Pangborn Corporation, 1400 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn for the right abrasive for every blast cleaning job.

Pangborn — DISTRIBUTORS FOR — **MALLEABRASIVE®**

U. S. Patent #2184926
(other patents pending)

Pangborn BLAST CLEANS CHEAPER
with the right equipment for every job

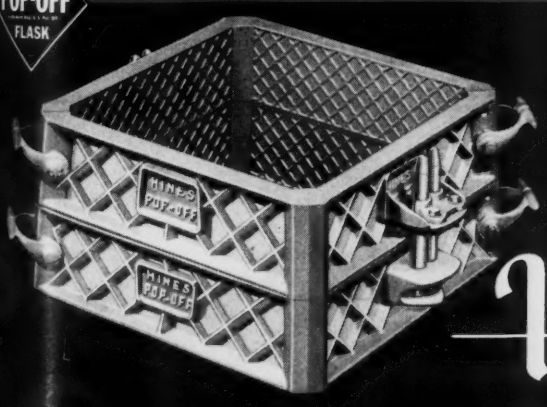

Chr

stmas

Stand fast therefore in the liberty
wherewith Christ hath made us free,
and be not entangled again with the
yoke of bondage.

—New Testament: Galatians, v, 1.

HINES POP-OFF FLASK



Hines Flasks

THE HINES FLASK CO., 3431 WEST 140TH STREET, CLEVELAND 11, OHIO

Pangborn Blastmaster Barrel shows Carrier Corporation . . .

HOW TO CUT COST

Because compressor parts for air conditioning equipment must be cleaned perfectly, the Carrier Corporation, Syracuse, N. Y., installed a Pangborn Blastmaster Barrel to handle the job.

This Blastmaster gives the perfect finish required . . . and its speed and efficiency have reduced cleaning time by 80% to 90%. Carrier estimates that this faster cleaning saves the firm an average of $300 a week—over $15,000 a year! No wonder George Teepell, Equipment Engineer, says: "Every one at Carrier is well pleased with the new Blastmaster Barrel. Its speed of cleaning is a real money saver, and the combination of the new, abrasive-tight door and efficient Pangborn Dust Collector eliminates the need to conduct this operation in areas isolated from the rest of the plant."

This report from Carrier is one of many concerning the Pangborn Blastmaster. Blastmasters all over the country are saving time and reducing labor costs. See for yourself. If you are interested in faster, cheaper, better cleaning, investigate the Pangborn Blastmaster Barrel. Available in 4 sizes—3, 6, 12, or 18 cu. ft. capacities. For more details, write for Bulletin 223 to: PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Maryland.

OVER 28,000 PANGBORN MACHINES SERVING INDUSTRY

Pangborn

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

BLAST CLEANS CHEAPER

with the right equipment for every job

Engineer Teepell and Blastmaster operator examine one of the cleaned castings. Note sparkling finish of cleaned castings at right.

$15,000 A YEAR

PANGBORN DUST COLLECTOR protects precision equipment from dust, lowering maintenance costs . . . cuts housekeeping costs . . . improves working conditions in the plant.
PANGBORN BLASTMASTER BARREL at Carrier. Exclusive features like abrasive-tight door, automatic torque throw-out arm, non-pinch work conveyor contribute to safer, cheaper work.

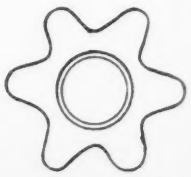
STEEL FOUNDRYMEN ONLY— are you troubled with FLOATING ALUMINUM?

Aluminum is outstanding as a deoxidizer for steel. However, it has one big disadvantage — it floats! Trying to deoxidize a full ladle of metal with shot or notch bar is tough — efficiency is down. But with USCO Aluminum deoxidization Stars you turn the disadvantage to an advantage. Cast as a six-pointed Star with a tapered hole through the center, it can be wedged on a steel rod and pushed to the bottom of the ladle. As the aluminum melts, it floats up through the steel and deoxidizes as it rises.

Say good-bye to inclusions and low efficiency — USE USCO STARS*

Stars come in both a 2 lb. and 5 lb. size.

Our metallurgists are available for a demonstration of the use of Stars in your plant.



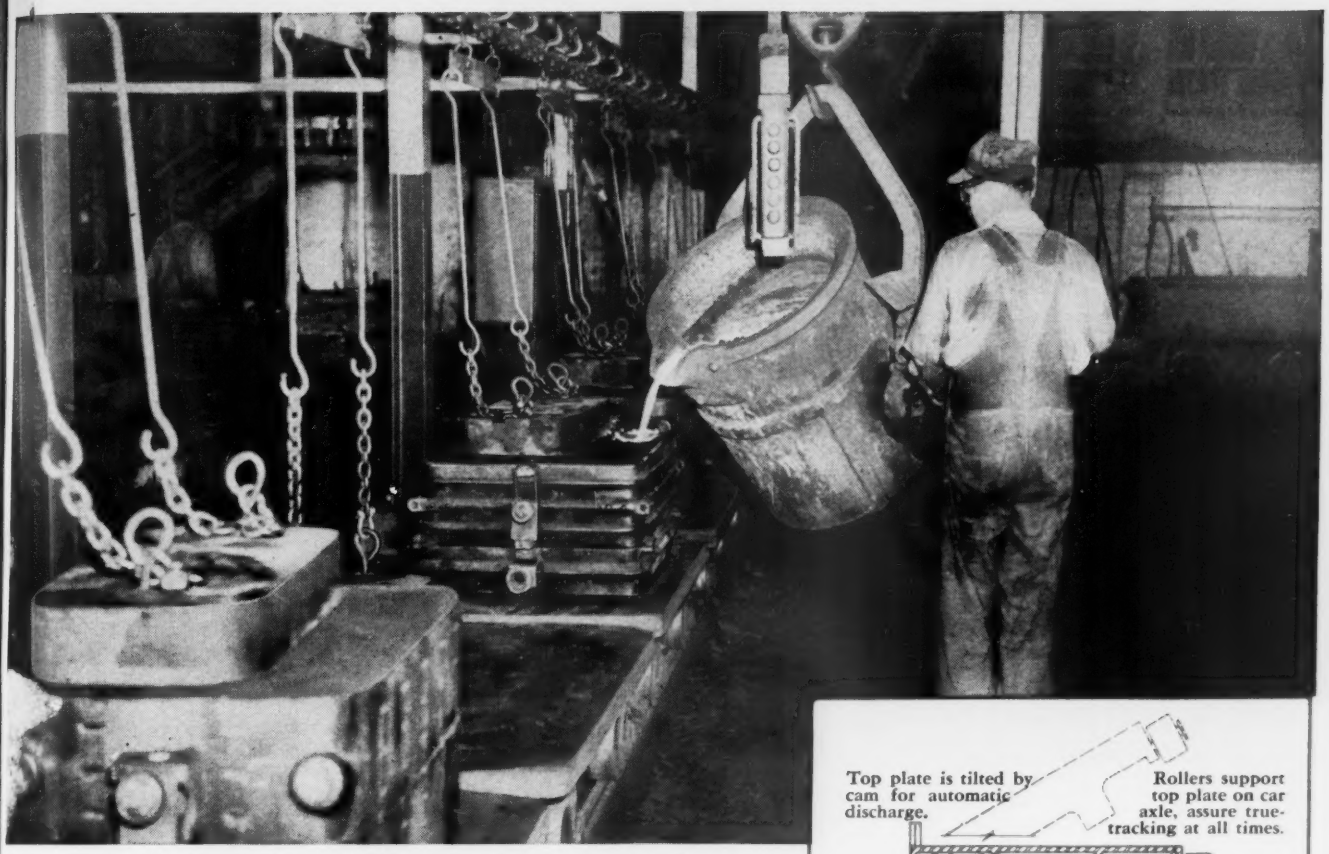
*Des. Pat. 703575

For 49 years, pioneers in aluminum development.

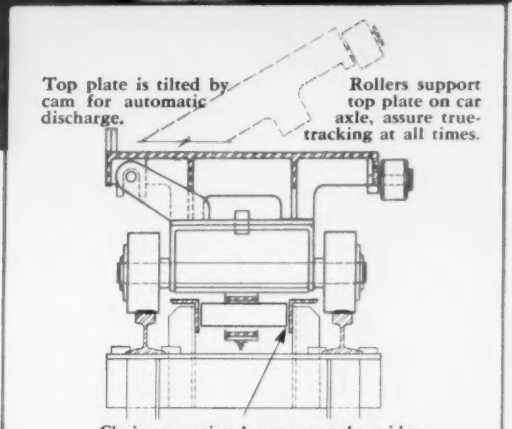
USCO U. S. REDUCTION CO.
East Chicago, Indiana

PLANTS: EAST CHICAGO, INDIANA • TOLEDO, OHIO

Move molds from closing to shakeout—continuously... automatically... at low cost



Southern pipe foundry mechanizes entire pouring operation. Tru-Trac mold conveyor, Link-Belt weight-setting overhead trolley conveyor and overhead pusher type ladle conveyor are synchronized.


Top plate is tilted by cam for automatic discharge.
Rollers support top plate on car axle, assure true-tracking at all times.

Chain operating between angle-guides positions car wheels on T-rail tracks.
Cross section of Tru-Trac mold conveyor.

LINK-BELT Tru-Trac Conveyor carries molds through molding, pouring, cooling and shakeout with maximum efficiency

MECHANIZATION by Link-Belt pays foundries big dividends in increased production . . . better casting at lower cost . . . improved working conditions. Take the Tru-Trac Mold Conveyor as an example.

Without ever leaving their individual cars, molds travel irregular paths . . . up and down inclines. Tru-Trac makes possible centralized, synchronized pouring . . . mechanical weight shifting . . . automatic mold discharge. And because exhaust hoods cover the cooling and shakeout zones, noxious smoke and fumes are eliminated.

Tru-Trac is one of several types of Link-Belt mold conveyors. Link-Belt also builds a full line of other casting and sand handling and preparation equipment. In addition, our foundry engineers can draw on Link-Belt's broad experience in foundry mechanization. It's an unbeatable combination—a sure way to bigger foundry profits.

No attendant is required at the shakeout position because of automatic dumping. Note that bottom boards are retained on the conveyor.

LINK-BELT

CONVEYORS and PREPARATION MACHINERY

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities. 13,084

curious?

Furnace Operators! A little curiosity about this amazing FREE service can pay big dividends. *It's the Cities Service Heat Prover*. . . "not an instrument you buy, but a service we supply!" This unique instrument offers rapid, continuous sampling . . . simultaneous reading and direct measurement of oxygen and combustibles . . . and easy portability. We maintain the Heat Prover free of charge! It's not a curious fact that so many furnace operations have been bettered with the Heat Prover. Find out how and why the Heat Prover can increase furnace productivity for you. Call or write your nearest Cities Service Office or write Cities Service Oil Company, Dept. **L23**, Sixty Wall Tower, New York City 5, N.Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

the hole story of HA efficiency

EACH opening in the HA air cylinder has been plotted to fill your lines with extra cubic feet of air for every power dollar. Some holes take the free-flowing compressor valves. Some admit water to the effective cooling jacket. Other openings hold regulators that keep the HA in step with your air demands. Get the whole story today. Send for Bulletin HAC-36.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Ave., Toronto 13, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

FOR A *Quick* SURFACE-METAL SET . . .

DELTA Z-KOAT and Z-Z-KOAT

CORE AND MOLD WASHES

Contain ZIRCONIUM

DELTA Z-KOAT and Z-Z-KOAT Washes are easy to mix and easier to apply. After mixing, there is no danger of precipitation and, when dry, are completely moisture-proof. Applied by swabbing, dipping or brushing they adhere uniformly to the sand and produce smooth, highly-refractory surfaces.

Both DELTA Z-KOAT and Z-Z-KOAT Washes have unusually high fusion points and, because of their high heat conductivity, provide a more rapid surface-metal set. Both washes are economical to use.

DELTA Z-KOAT contains zirconium plus other high fusion refractories and DELTA Z-Z-KOAT is an all-zirconium type wash.

Working samples together with instructions available on request.

DELTA

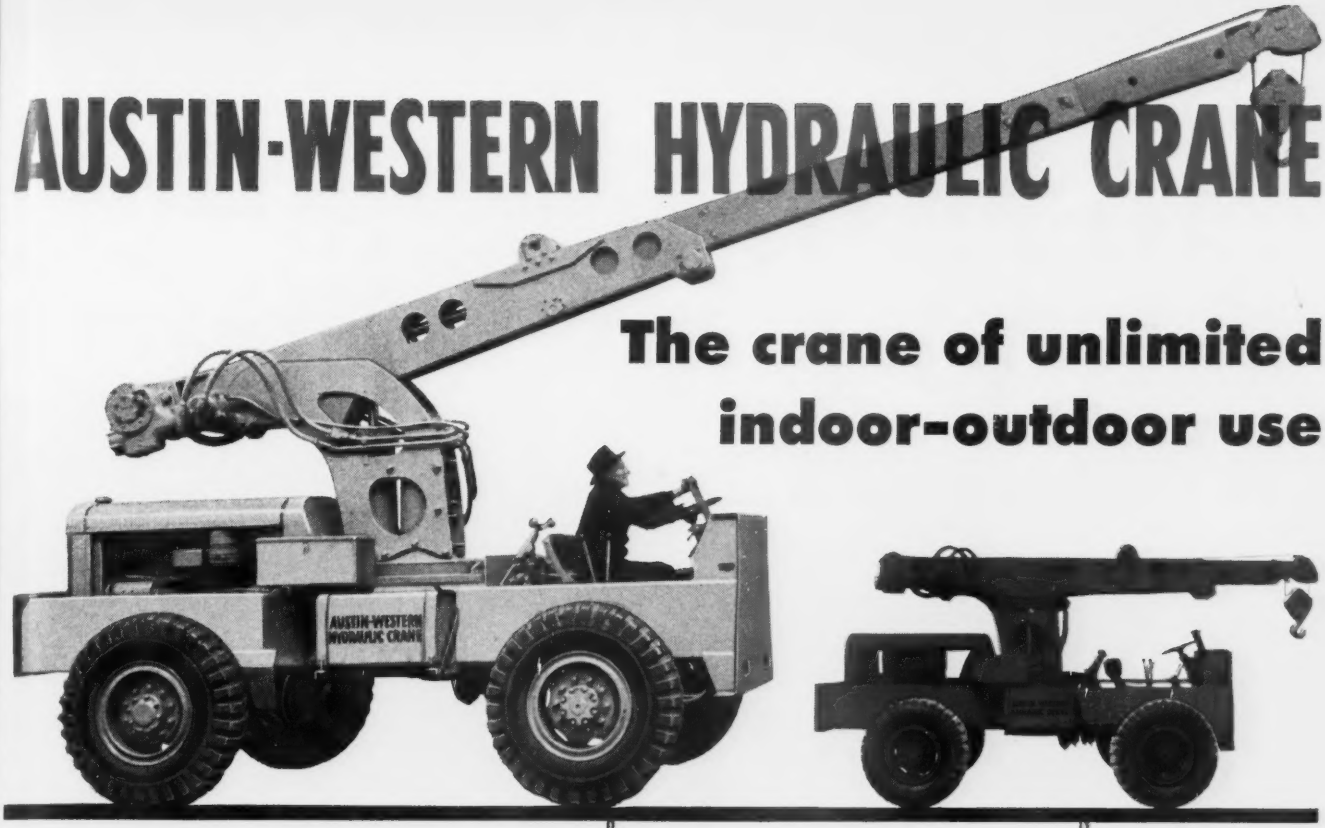
OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

AUSTIN-WESTERN HYDRAULIC CRANE

The crane of unlimited indoor-outdoor use



IDEAL FOR USE WITH CLAMSHELL AND MAGNET

Designed only after a complete analysis of crane requirements – here is TOMORROW'S answer to TODAY'S materials handling problems.

Complete hydraulic operation includes:

- ✓ Continuous 360° turntable rotation,
- ✓ Extension and retraction of the boom,
- ✓ Raising and lowering of the cable,
- ✓ Boom elevation.

Available in both tractor and truck-mounted models, this self-propelled Hydraulic Crane, with its pickup, carry and placement capabilities, combines the best features of crawler, truck and erection cranes with those of industrial cranes . . . will prove a big time, labor and money saver on many construction and maintenance jobs.

Send for additional information NOW.

AUSTIN-WESTERN COMPANY

Construction Equipment Division • Baldwin-Lima-Hamilton Corporation

AURORA, ILLINOIS, U.S.A.

Power Graders • Motor Sweepers

Road Rollers • Hydraulic Cranes

AUSTIN-WESTERN COMPANY
627 Farnsworth Avenue, Aurora, Illinois

Please send complete information and literature on the Austin-Western Hydraulic Crane.

Name .....

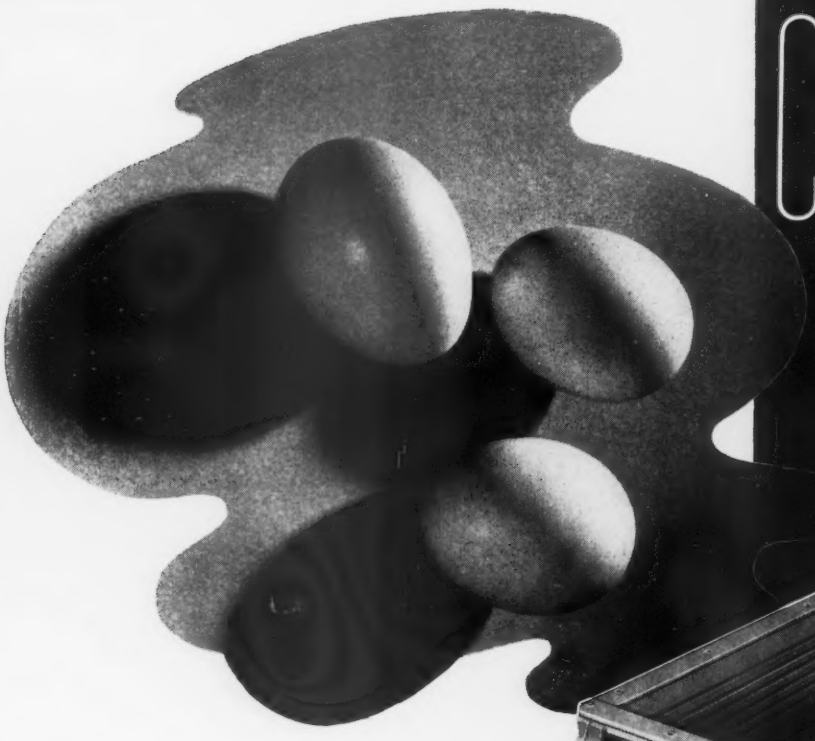
Title .....

Company .....

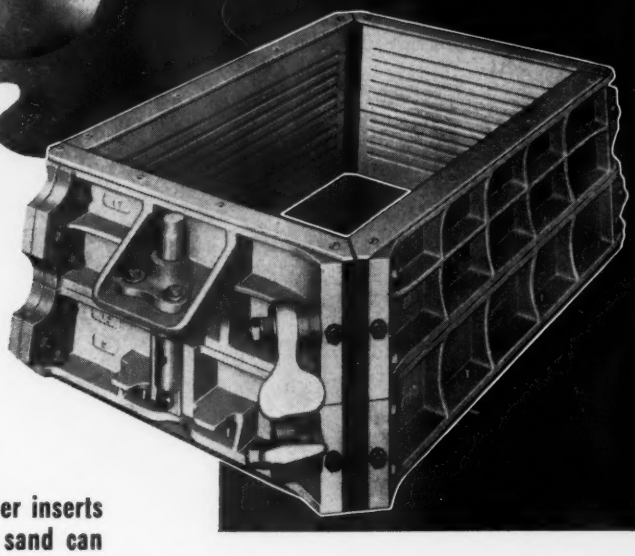
Street .....

City ..... Zone ..... State .....

Other products: Power Graders, Motor Sweepers, Road Rollers



COMPLETELY CLOSED



Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps so that no sand can lodge in the open corners of the new

FREMONT SPREADLOCK FLASK

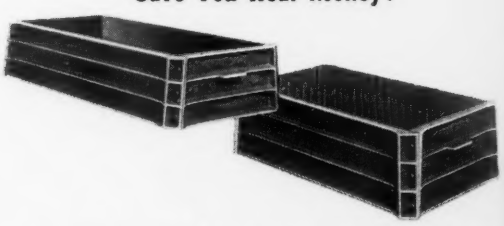
The accurately machined inside surface and flanges, and steel-faced top and bottom flanges assure more exacting work. Magnesium has twice the tensile strength of aluminum — which means longer service — and magnesium weighs ⅓ less than aluminum — which means easier handling.

Write today for free literature and prices on Fremont Spreadlock Flasks, Fremont Standard Slip Flasks (with the GROOV-LOCK FOOLPROOF PIN) and Fremont Cast Iron or Cast Aluminum Jackets (which permit easy insertion of new sides and ends).

All orders given prompt attention.

FREMONT CAST IRON OR CAST ALUMINUM JACKETS

Save You Real Money!

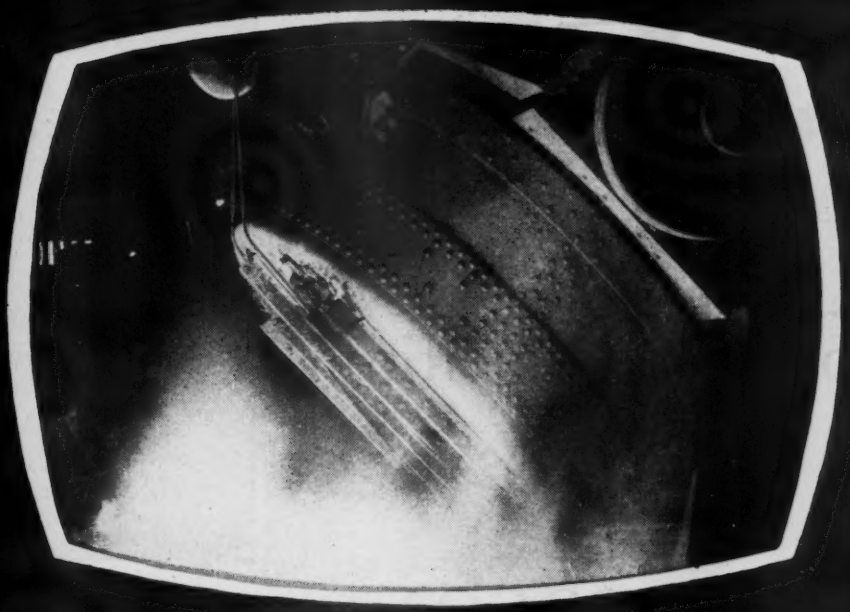


Precision machined and drilled, bolted corner construction permits easy insertion of new sides or ends. The entire jacket need not be scrapped. Standard style for ordinary foundry practice. Grooved style, which permits ready gas escape, for steel foundries. Flasks and jackets can be assembled on 3°, 4°, or 5° taper.

THE FREMONT FLASK COMPANY

Fremont, Ohio

telling the story of 'dag' dispersions



What Do *YOU* Want a Mold Wash to Do?...

...Prevent sticking? A **'dag'** colloidal graphite mold wash prevents sticking because it forms a micronically thin, exceptionally slippery *dry lubricating film.* It speeds parting and assures smooth castings.

... Go on easily? **'dag'** dispersions can be sprayed on, painted on, or applied by dipping. They are ideal for molds, patterns, chills, cores, push pins, shoulder screws, flask pins ... even ladle interiors. Results: superior reproduction, elimination of binding and stripping, increased mold life, reduced inspection time.

... Work without smoking? Water dispersions of **'dag'** colloidal products improve shop conditions by eliminating irritating smoke caused by most parting compounds.

And if you want to avoid chilling, use a **'dag'** refractory mold wash.

Learn more about **'dag'** dispersions for foundry operations. Write *today* for Bulletin 425-14M.

Dispersions of molybdenum disulfide are available in various carriers. We are also equipped to do custom dispersing of solids in a wide variety of vehicles.

dag DISPERSIONS®

Acheson Colloids Company, Port Huron, Mich.

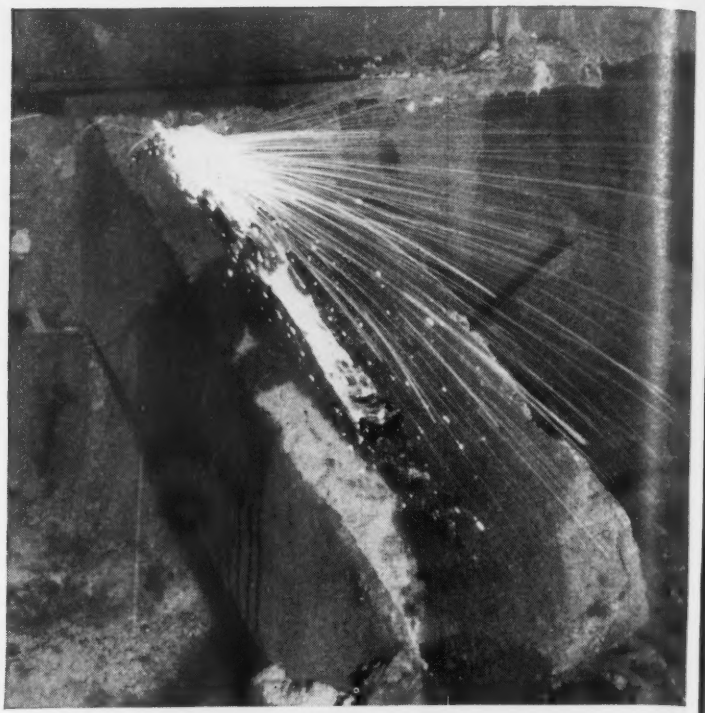
... also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

Units of Acheson Industries, Inc.

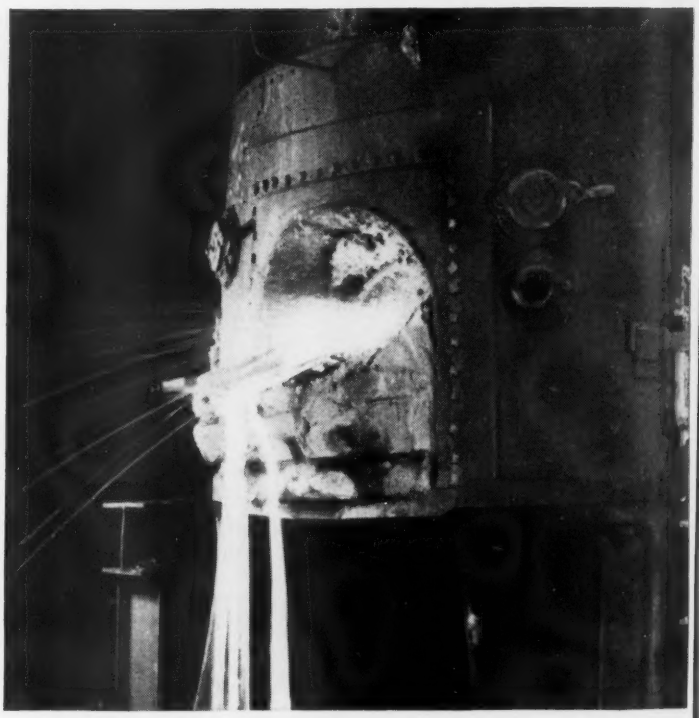
try 'dag' resin-bonded dry films for permanent lubrication

Rx

for a metal-melting malady...



CRYSTOLON* slag hole blocks



Is your production suffering from too-frequent furnace shutdowns — while you're replacing slag hole blocks that can't stand the gaff?

There's a special Norton Rx — an engineered refractory prescription — for this metal-melting headache. *Install CRYSTOLON slag hole blocks!*

Then, like countless other foundry men, you'll get a new slant on modern furnace operation. You'll find CRYSTOLON blocks (made of hard, dense silicon carbide) resisting erosion and corrosion at temperatures up to 3050°F, and under severest back-slagging conditions. You'll find them outlasting fire clay more than 5 to 1, without spalling, cracking or loading — and that upwards of 30 hours continuous operation is not unusual for them.

Get Actual Proof

of how CRYSTOLON blocks can benefit your production. Give them a workout in your cupolas, and compare them for efficiency and economy with whatever you're now using. They're made in shapes to meet every foundry requirement. Ask your Norton representative for details, including prices, or write to NORTON COMPANY, 311 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON

Rx *REFRACTORIES*

Making better products... to make other products better

NORTON COMPANY, WORCESTER 6, MASSACHUSETTS

Answers to Shakeout Problems

How to Select the Right Unit . . . Decide for yourself. The new bulletin (illustrated at right) shows how to choose the best unit for the job, how to decide on deck openings, layout, motor, etc.

How to Reduce Installation Costs . . . You can avoid heavy, massive foundations. Installation of a *Foundromatic* shakeout is easy. Low headroom requirement allows plenty of room for sand removal system.

How to Cut Maintenance . . . Simplified *Foundromatic* shakeout design has fewer parts. Construction is unusually rugged. Less time is required for shaking out.

Get your copy of this helpful bulletin. Ask your nearby Allis-Chalmers office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for "*Foundromatic* Shakeouts," Bulletin 07B6365B. A-4163

Foundromatic and *Regulex* are Allis-Chalmers trademarks.

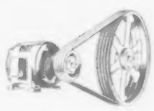
ALLIS-CHALMERS

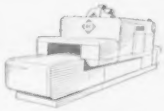
A-C ALLIS-CHALMERS

Foundry Equipment for Bigger Output—Better Working Conditions!

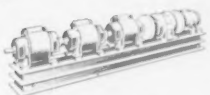
Vibrating Screens

Cupola Blowers


Motors-Drives Control


Foundromatic Core Dryer

Induction Heating & Melting


Regulex Arc Furnace Control

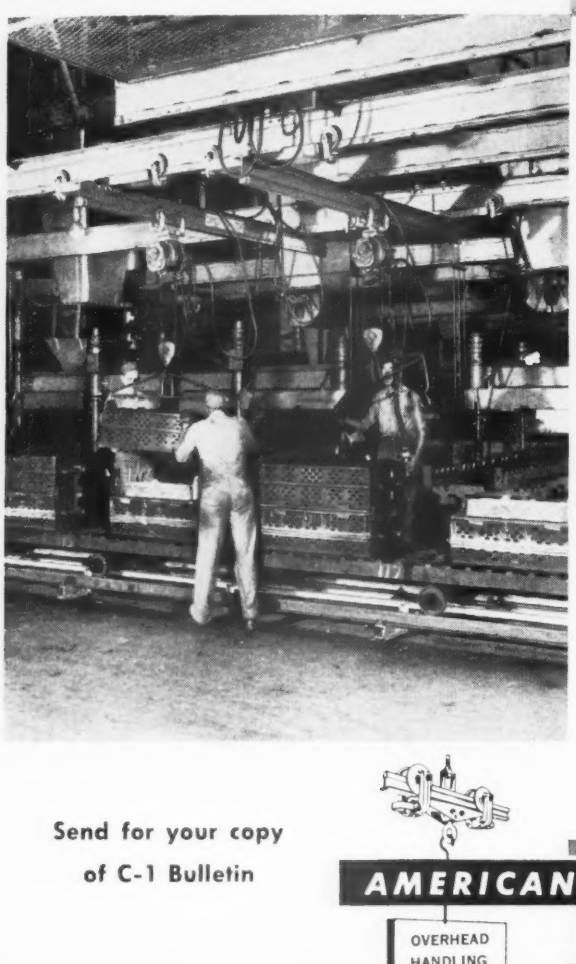
USE

MONORAIL CRANES

. . . Where Space is Limited

. . . To Handle Variable Jobs

. . . For Low Maintenance Cost



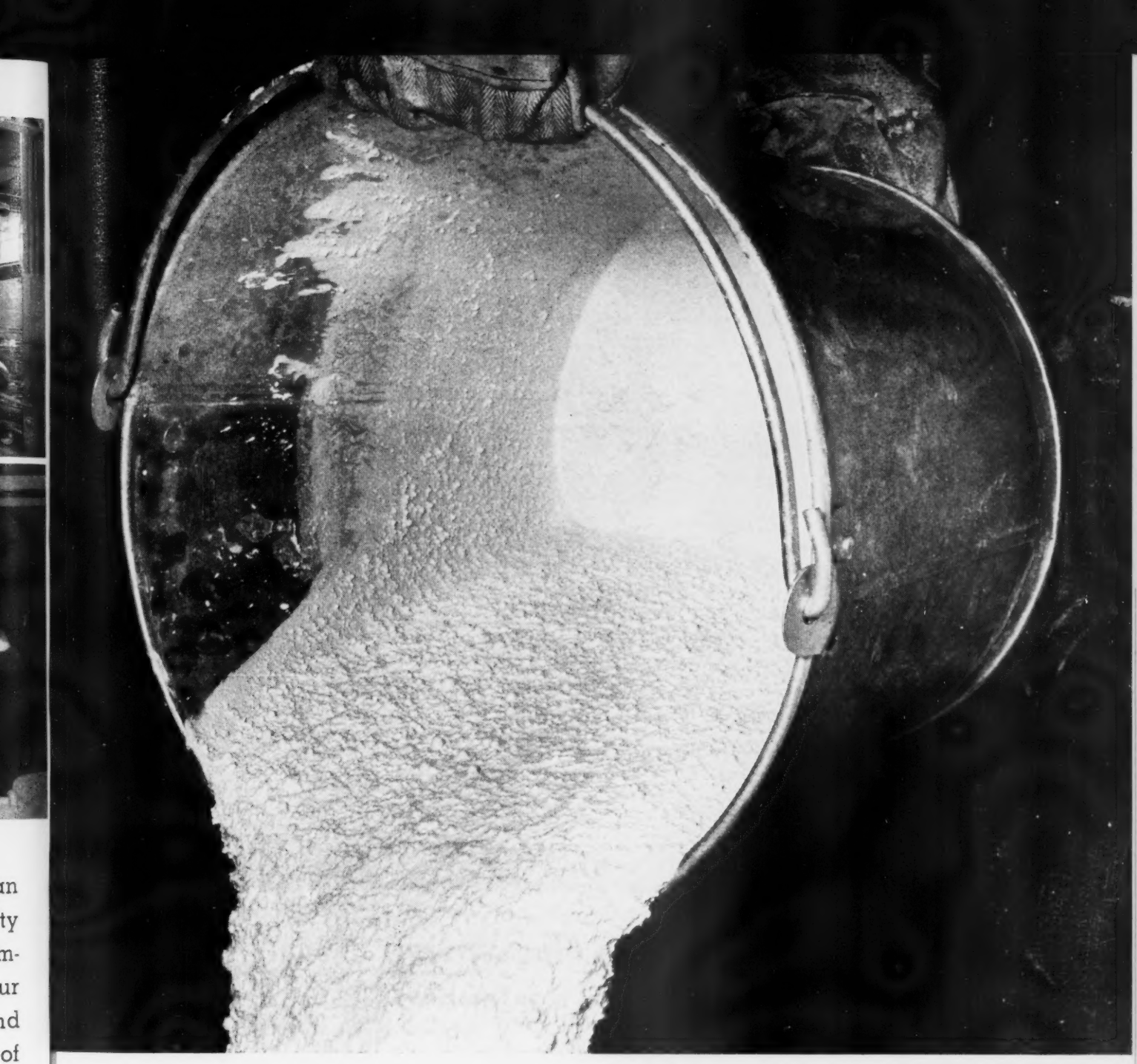
These are just a few reasons why American MonoRail Cranes are gaining in popularity and are being installed in increasing numbers of plants the country over. Call in your American MonoRail representative and have him tell you all the advantages of MonoRail Cranes such as—ease of handling—smooth travel—strength—safety interlocks—power operation and **interlocking carrier service between and beyond the craneways.** Consultation in connection with any handling problem is available without obligation.

Send for your copy of C-1 Bulletin

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13104 ATHENS AVENUE • CLEVELAND 7, OHIO



Just mix with water and pour . . . the most convenient of all

High-Temperature Insulating Materials

For convenience, speed of installation, and minimum downtime you can't beat ALFRAX® castable aluminum oxide cements. To install, just mix them with water and pour—like regular Portland cement. They start to harden almost immediately after casting.

These ALFRAX castables, being made of aluminum oxide, are highly refractory. They will stand up under temperatures ranging from 2800 to 3100 F, depending on type—with practically no shrinkage. They are unaffected by furnace atmospheres and combustion gases. They have low heat capacity, and thereby permit faster heating of a furnace. Because the alumina in the cement is in the form of very small, hollow spheres which effectively block heat loss, ALFRAX castables are among the best insulating materials for very high temperature work.

ALFRAX castables make ideal back-up linings for nonferrous crucible furnaces, either pit type or tilter. They make suitable burner blocks for core ovens or malleable annealing furnaces. They can be used to back up sidewalls of reverberatory furnaces. In short, they can be used almost any place where the convenience of a castable is desired along with assurance of longest possible life.

Why not check up? We make lining materials to fit *every* need—rings, ring segments, and cements—and will gladly furnish recommendations to fit *your* needs. Address Dept A-123, Refractories Div., The Carborundum Co., Perth Amboy, N. J.

CARBORUNDUM

Registered Trade Mark

P&H OVERHEAD CRANES

Why P&H builds the entire Crane

. . . including electrical equipment!

If you want the utmost in service from your cranes, insist that they be job *engineered* by P&H — not an assembly of components from various sources. For example, general purpose electric motors don't stand the gaff of crane service like those *designed* for the job. That's why P&H builds its own motors, brakes and controls — with all characteristics *properly suited* to crane operation: P&H electrical equipment throughout is your assurance that all functions are perfectly coordinated. It means better service, less maintenance.

This policy of complete quality control — of single manufacturing responsibility — better service — made P&H the leading builder of overhead traveling cranes. Continuous improvement, far ahead of the field, has extended this leadership. Benefit by it when you buy your next cranes.

*T.M. of Harnischfeger Corporation for electromagnetic type brake.

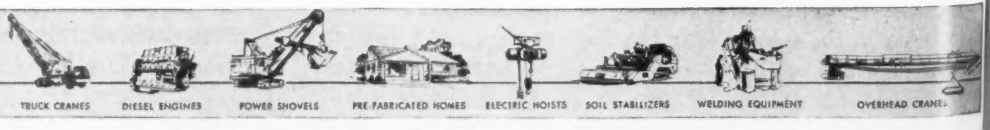
P&H OVERHEAD CRANE DIVISION

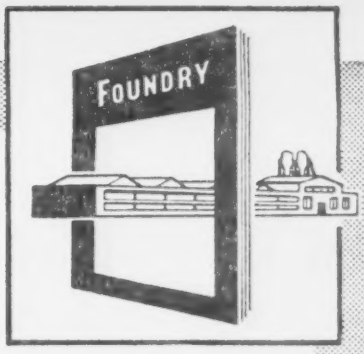
HARNISCHFEGER CORPORATION

Milwaukee 46, Wisconsin

P&H MAGNETORQUE* AC Crane Control is the most important development in crane service in 25 years.

the P&H Line





Dear Reader:

This page has been provided for your convenience. Use one of the return cards below for more information on advertisements in this issue of **FOUNDRY**.

Write the name of the advertiser and the page number of the ad in the spaces provided. Check the type of information you want. After you have finished going through this issue of FOUNDRY and have jotted down all of the ads on which you'd like more information, just tear out the card, drop it in the mail. We'll do the rest.

Our staff will forward this information to the advertiser immediately so you'll be relieved of the necessity of writing several letters. You'll hear from the advertiser directly, answering your request.

FOUNDRY
Readers Service

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed In the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio
Readers Service Dept.

Please send further information on the following advertisements in this issue:

PAGE NO.	NAME OF ADVERTISER	Send Technical Data	Send Price Information	Nearest Source of Supply
-------	----------	○	○	○
-------	----------	○	○	○
-------	----------	○	○	○
-------	----------	○	○	○

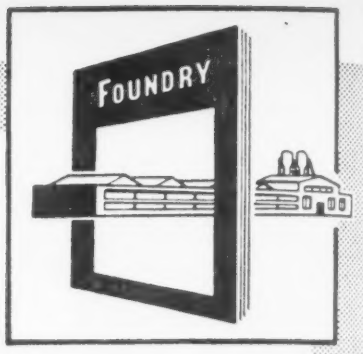
YOUR NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

FDY 12-53



Dear Reader:

This page has been provided for your convenience. Use one of the return cards below for more information on advertisements in this issue of **FOUNDRY**.

Please send further information on the following advertisements in this issue:

PAGE NO.	NAME OF ADVERTISER	Send Technical Data	Send Price Information	Nearest Source of Supply
-------	----------	○	○	○
-------	----------	○	○	○
-------	----------	○	○	○
-------	----------	○	○	○

YOUR NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

FDY 12-53

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

Write the name of the advertiser and the page number of the ad in the spaces provided. Check the type of information you want. After you have finished going through this issue of FOUNDRY and have jotted down all of the ads on which you'd like more information, just tear out the card, drop it in the mail. We'll do the rest.

Our staff will forward this information to the advertiser immediately so you'll be relieved of the necessity of writing several letters. You'll hear from the advertiser directly, answering your request.

FOUNDRY
Readers Service

"I'll get to BUFFALO ANY WAY

...to get those BETTER BUFFALO PATTERNS"

They come by train, by plane, by car,
They come from near, they come from far,
Cause foundry men who really know,
Buy *better* patterns from "Buffalo."

Our Engineers plan through and through,
Details of every job we do,
And Craftsmanship that can't be beat,
Produces patterns oh so sweet.

With you our patterns make a hit,
Because your foundry they will FIT,
With extra rigging you're not caught,
And adapting, don't give it a thought.

Production schedules really climb,
You get profitable peace of mind,
Scrap ratios almost disappear,
When *you* need patterns, GET 'EM HERE.

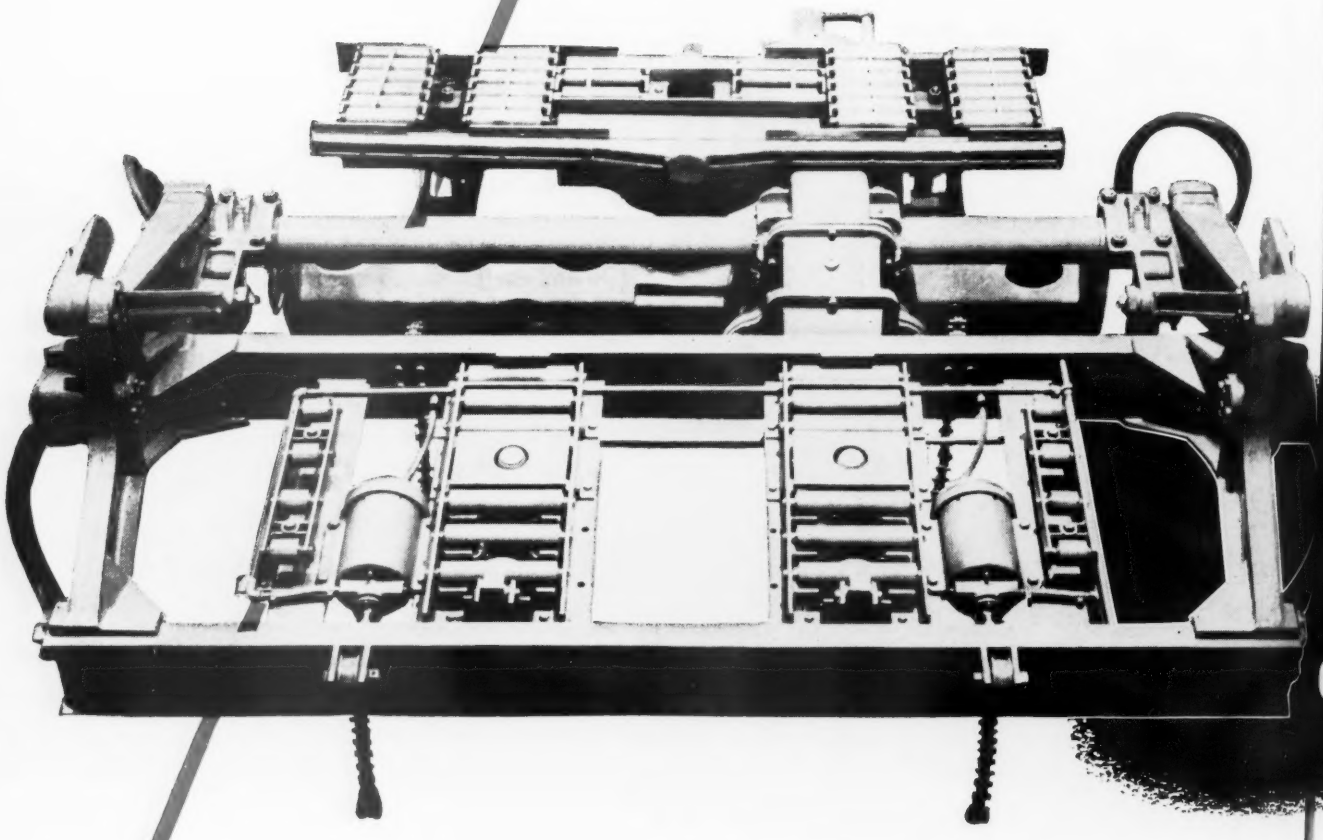
Be our guest Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

Production and Experimental Pattern Equipment • Shell Mold Pattern Equipment and Engineering • Wood and Plastic Models • Jigs, Templates and Target Fixtures • Permanent Molds • Forging and Stamping Dies • Dies for Injection and Reinforced Plastics Molding • Special Precision Parts • Special Machinery and Tooling • Metallizing • Engineering Drawing Service

BUFFALO PATTERN WORKS, INC.
832 HERTEL AVE., BUFFALO 16, N. Y.
DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

These comparatively new Herman Charging Conveyor Type Machines are extremely popular, whether operated in molding departments or core departments. They work equally well with either a Jolt machine or Sandslinger.

A versatile, rugged machine, it is produced in our broad range from 500 to 20,000 lbs. rollover capacities.



HERMAN MOLDING MACHINES M

A typical core department cycle of operations is as follows:

1. Core box filled with sand and placed on the jolt unit.
2. Power lift conveyor lowers box on sub-plate.
3. Core box is jarred and elevated by power lift conveyor to standard conveyor level.
4. Box goes to Charging Conveyor Rollover and Draw Machine, manually or by pusher mechanism.
5. Pneumatic core box and core plate clamps engage rammed core box for rollover operation.
6. After rollover, core clamps are disengaged and slow draw operation starts.
7. Vibrators separate bond between core box and sand.
8. Fast draw operation checked by speed control device and core box gently deposited directly on discharge conveyor and rolled away on companion conveyor.
9. Inverted turnover plate and core box rolled back to upright position, pneumatic clamps disengaged and box returned to either jolt station or storage.
10. Another rammed core box should, of course, now be at the Charging Conveyor Rollover and Draw Machine for the production of another core.

Herman Charging Conveyor Rollover and Draw Machines are extremely flexible. Each machine is capable of producing a large range of sizes in either your molding or core department.

Send for further information today.

There is a type and size Herman Molding Machine for all foundry operations.

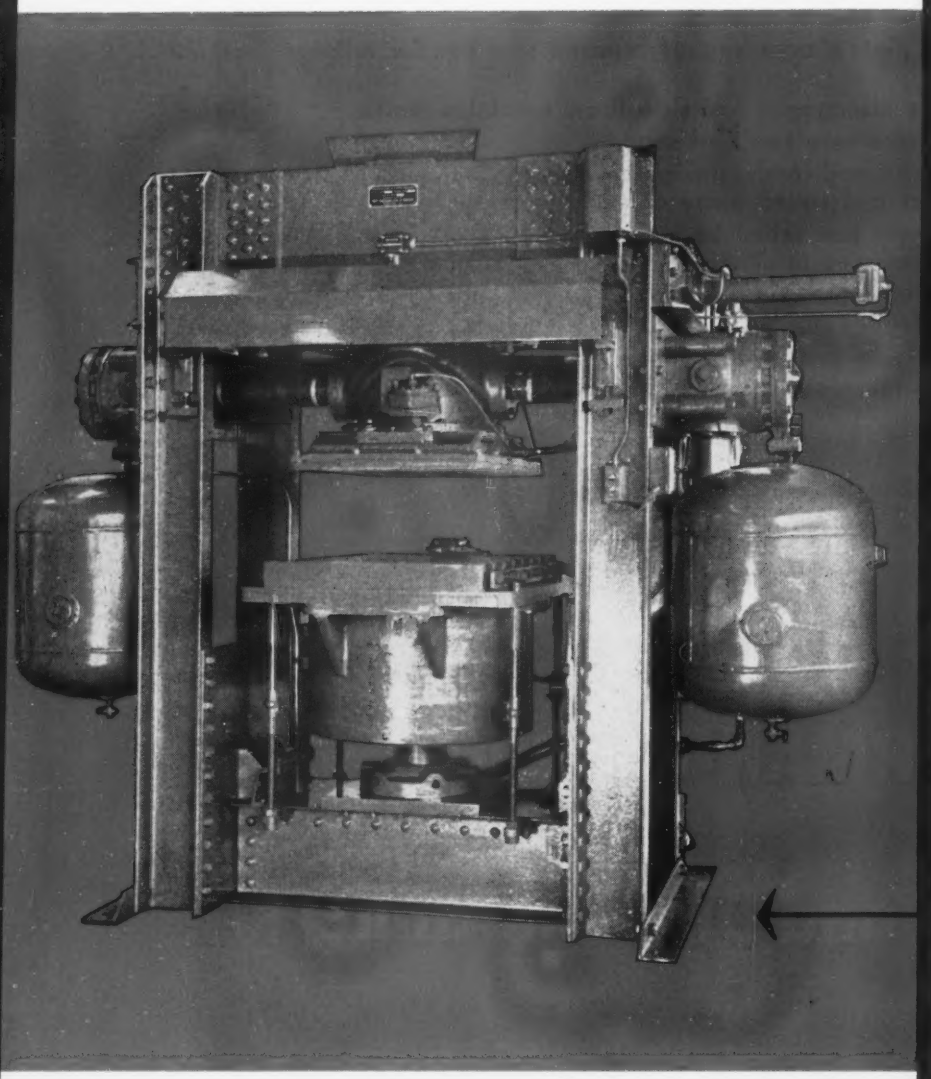
Here is the HERMAN Charging onveyor Rollover and Draw Machine

S M EIR WAY BY THE WAY THEY'RE MADE

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

When "TRACTOR" was a brand new name



Demmler Core Blowers were already first . . .

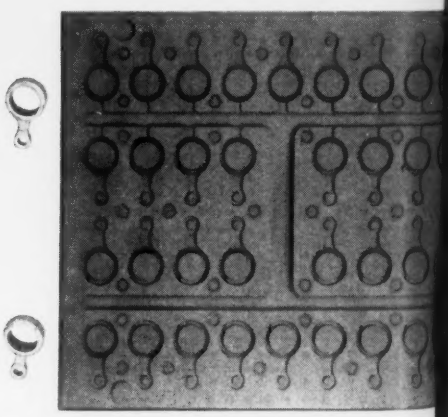
It was in the year 1906 that the term "tractor" first came into general usage. Those early models were big and clumsy but the foundry industry was proud of its contribution. Just 3 years later Demmler introduced the first core blower — one of the factors that allowed the foundry industry to keep pace with the demand for better tractor castings.

A DEMMLER "FIRST"

built especially for D-process shell molding

The 104E is another "first" by Demmler, whose pioneering research has been giving the foundry industry new practical ideas for 43 years. It's another in the famous Demmler "100" series of core blowers. The 104E is especially adapted for D-process shell molding, but can also be used for regular core blowing. It can be furnished with or without the new Demmler sleeve type magazine that will blow ANY core sand without the need for special mixing.

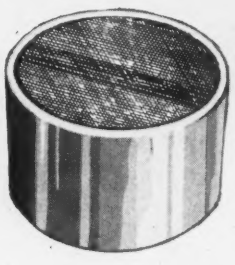
THE DEMMLER 104



A typical Example of D-process shell mold blown on the Demmler 104E. Close tolerances and sharp detail are possible with Demmler equipment.

Another Demmler "first"

At right, you see the special D-process core box vent first manufactured by Demmler. Stainless steel screen, 150 mesh, that needs no cleaning. In sizes 3/16″ to 1″, built especially for D-process shell molding.



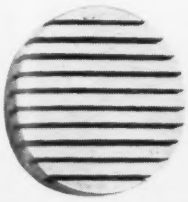
Write for literature

WM. DEMMLER & BROS.

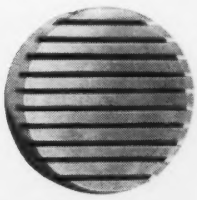
KEWANEE, ILLINOIS

DEMMLER PRECISION CORE BOX VENTS

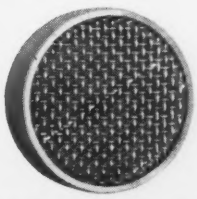
When you specify Demmler Core vents you can be sure of their quality because they are built by specialists—manufacturers of core blowing equipment exclusively since 1911. Sizes and specifications to meet your requirements, each vent held to close tolerances. Write for literature describing Demmler vents, with detailed specifications for each type.



TYPE D — BRASS SLOTTED VENT — Head thickness .12", slot widths .010", .013" and .015". For curved core box surfaces.



TYPE C — STEEL SLOTTED VENT — Thin head, cadmium plated, for flat surfaces. Slot widths .010", .013" and .015".



TYPE H — SCREEN VENT — Brass body with stainless steel wire mesh. Standard meshes No. 30, No. 40 and N0. 50 available.

TYPE B — PERFORATED VENTS— Staggered slots, .020" x .115"; brass vent with head of brass perforated sheets.

TYPE A — PERFORATED VENTS— Hole sizes; No. 00 (.020" dia.) No. 0 (.024" dia.) No. 1 (.027" dia.), No. 2 (.033" dia.)

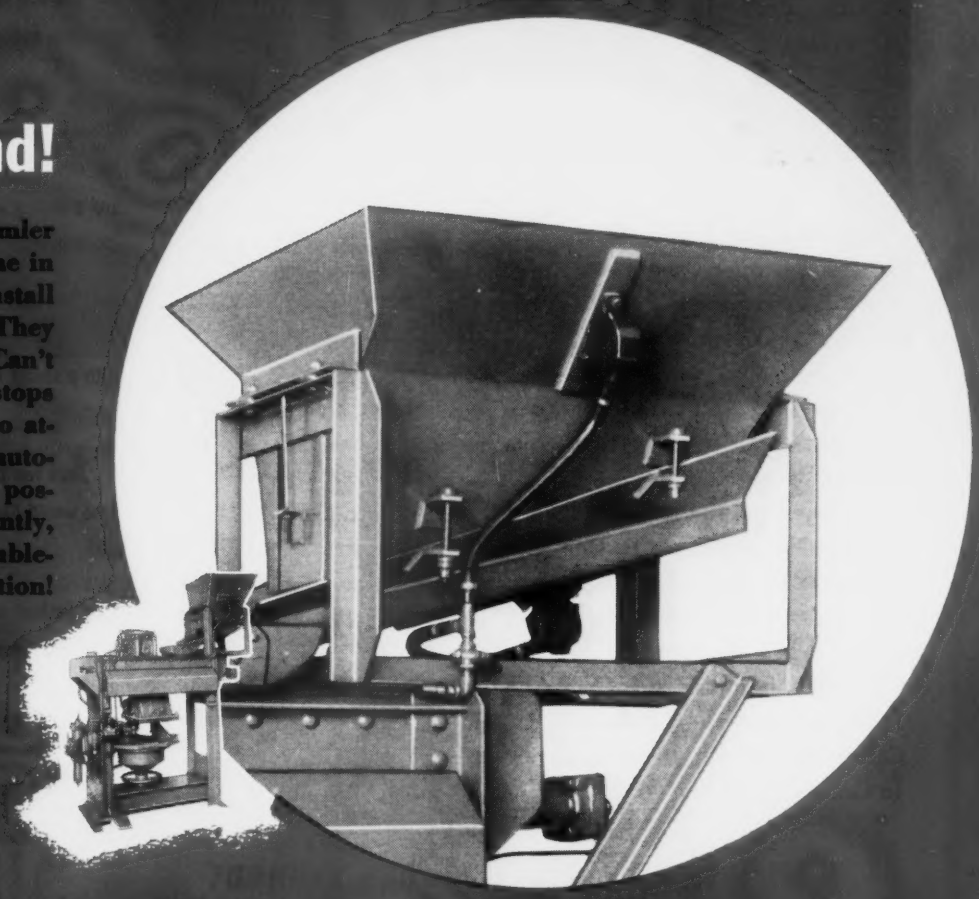
TYPE L — LECTROMESH VENT — Brass vent, head made of .010" thick Lectromesh sheet, with .22" square holes.

DEMMLER

NON-CLOGGING VIBRATORY SAND FEEDER

Stop poking sand!

Step up production on your Demmler Core Blowers! No more wasted time in loading or poking sand when you install Demmler Vibratory sand feeders. They keep sand flowing like water! Can't overfeed because sand delivery stops when the hopper is full. Needs no attention once set in operation, automatically feeds carriage in filling position. Vibrators always start instantly, require no maintenance. A trouble-free answer for faster core production!



A size to fit any Demmler Core Blower. Available for all Demmler machines from the small 55 to the large No. 4E, with 4 cu. ft. capacity for chute loading and up to 21 cu. ft. capacity for dump bucket loading.

WM. DEMMLER & BROS. • Kewanee, Illinois

POWDER-WASHING SPEEDS CLEAN-UP

Removes excess and defective metal quickly, easily, and at low cost

Cleaning-floor bottlenecks eliminated, production up, costs down, scraps and recasts negligible—that's the gist of enthusiastic reports on LINDE's powder-washing process.

Powder-washing combines the quiet speed of oxygen-cutting with a surface quality comparable to finish grinding. It removes fins, pads, sand inclusions, penetrations, burned core sand, chill bars, nails, chaplets, cracks and tears. It finishes flat or uneven surfaces to close tolerances with equal ease. And the powder-washing flame gets into places where other equipment can't.

Powder-washing can be applied to any carbon or alloy-steel casting. Equipment is simple. Technique is easily mastered in a short time.

For further details, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Dominion Oxygen Company, Limited, Toronto.

WHAT DO FOUNDRYMEN SAY ABOUT POWDER-WASHING?

"... powder-washing does for us in two hours what required one day of chipping."

*

"An hour of powder-washing has replaced four to six hours of grinding."

*

"Increased production and reduced labor and overhead more than make up for the cost of gases and powder consumed."

*

"... the equivalent of four days' chipping in one and one-half hours."

*

"... a casting which formerly required one hour of grinding is cleaned by powder-washing in less than five minutes."

*

"Powder-washing cleaned one casting in an hour, the other in 30 minutes. Conditioning by chipping and grinding would have taken three and two days respectively."

*

"... removed the shifted cores and penetrations with a saving of several hundred man hours."

*

"... in a few hours, cleaned up housings that otherwise would have had to be scrapped."

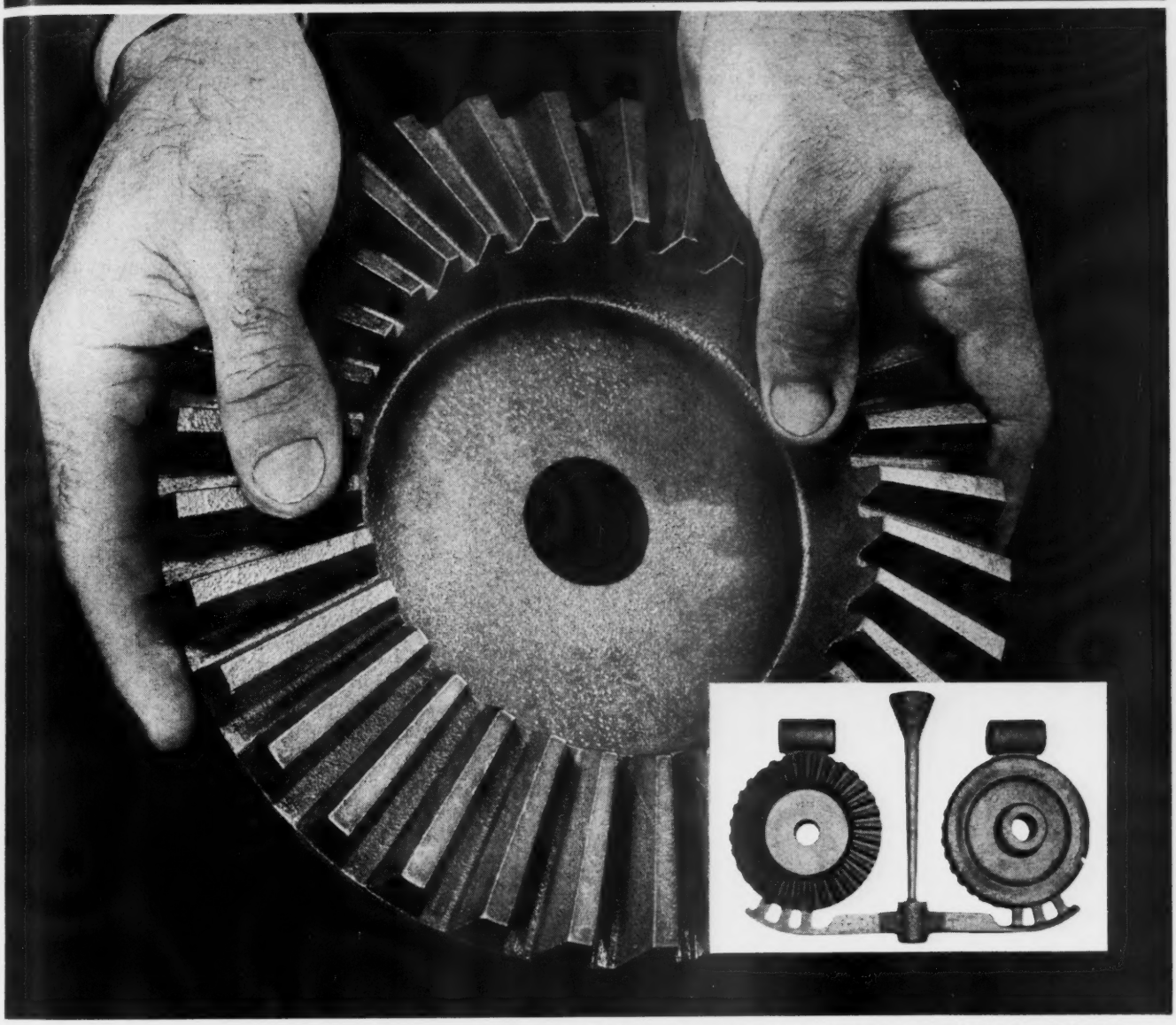
*

"... washed out a layer of sand from inside the cylinder in less than two hours, a job we could have done with no other available equipment."

LOOK TO *Linde* Trade-Mark know-how . . . show-how . . . products and processes FOR WELDING, CUTTING, TREATING, FORMING METALS

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

A PRODUCT OF FOUNDRY SKILL AND *Borden's* SHELL-MOLD RESIN



Casting by LYNCHBURG FOUNDRY CO. for NEW HOLLAND MACHINE COMPANY

Shell-molded: a better gear at lower cost

When this bevel gear went into shell molding instead of conventional green sand molds, the New Holland Machine Company immediately realized the following advantages:

1. Now ream instead of bore and ream. Cost of operation reduced 46%.
2. Now grind teeth on 5% of gears instead of nearly every gear. Cost reduced 75%.
3. Closer tolerances; dimension variations cut in half.
4. Smoother, more uniform teeth with less draft—.002″ instead of .016″.
5. Can now design a stronger gear because of less allowance for backlash.

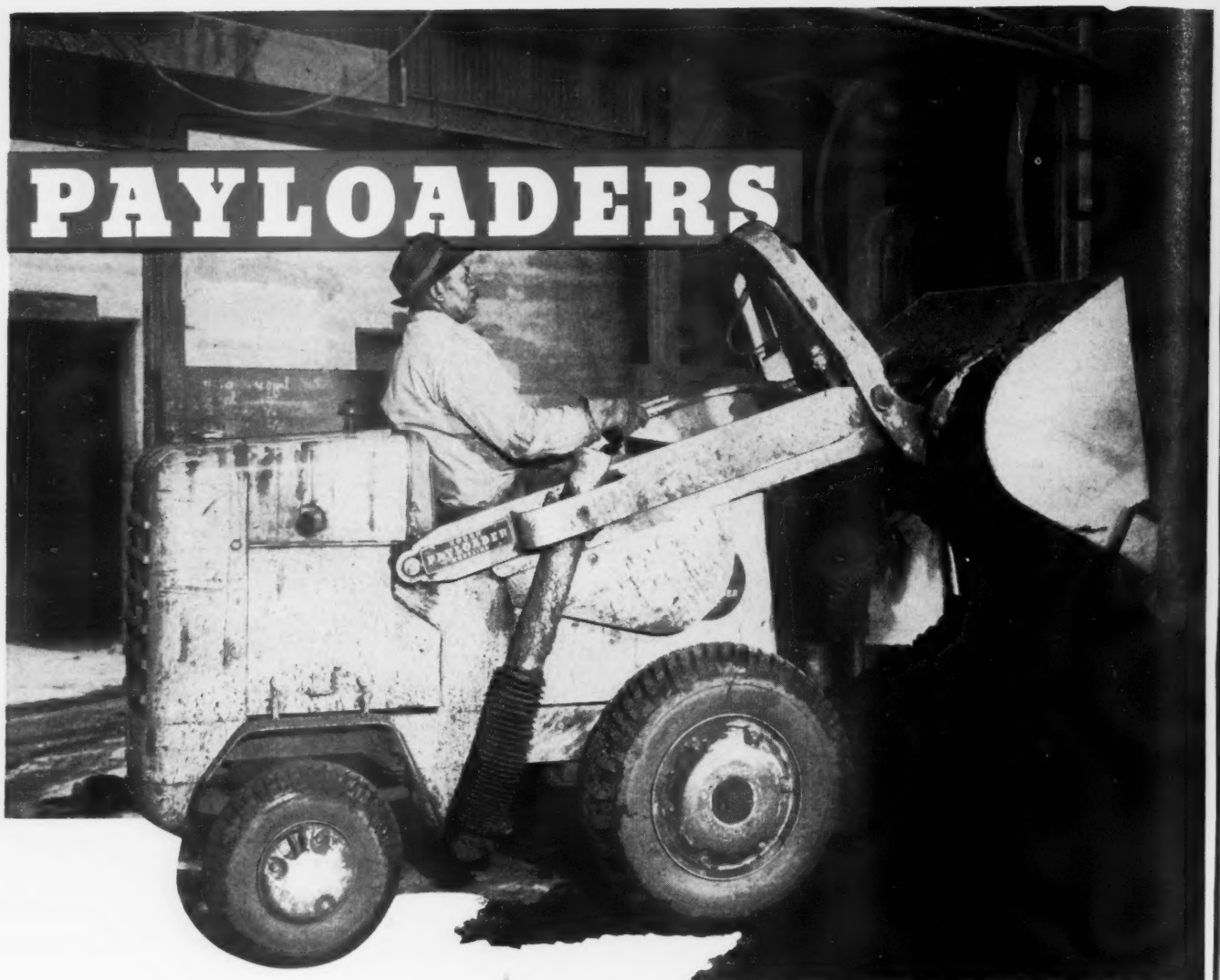
There are advantages for the foundry too: cleaner, faster mold-making with savings in time, in labor and in sand-handling costs.

Borden Foundry Engineers will be glad to help you adapt the shell-mold process to your needs. Address: *The Borden Company, Chemical Division, Dept. F123, 350 Madison Ave., New York 17, N. Y.* F.3.6

FOUNDRY PRODUCTS DEPARTMENT

THE BORDEN COMPANY

Chemical Division



FOR HIGH-SPEED, LOW-COST SAND HANDLING

You get your sand-handling operations into high gear when you put a "PAY-LOADER" on the job. And these versatile high-speed tractor-shovels put the skids under sand-handling *costs* too. They're doing a real job in foundries all over the land. They unload sand from box cars . . . carry it to storage . . . carry it to mullers . . . deliver it to molding stations and core makers . . . scoop it up from the pouring floors and clean-out rooms . . . return sand for reclaiming . . . windrow it for the cutter.

"PAYLOADERS" do other jobs too — such as handling small castings, slag, coke, coal, ashes, waste and snow. It will pay you to get the facts on the "PAYLOADER" way to faster, cheaper handling costs. Your "PAYLOADER" Distributor is ready to give them to you. Call him today or write The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Ill.

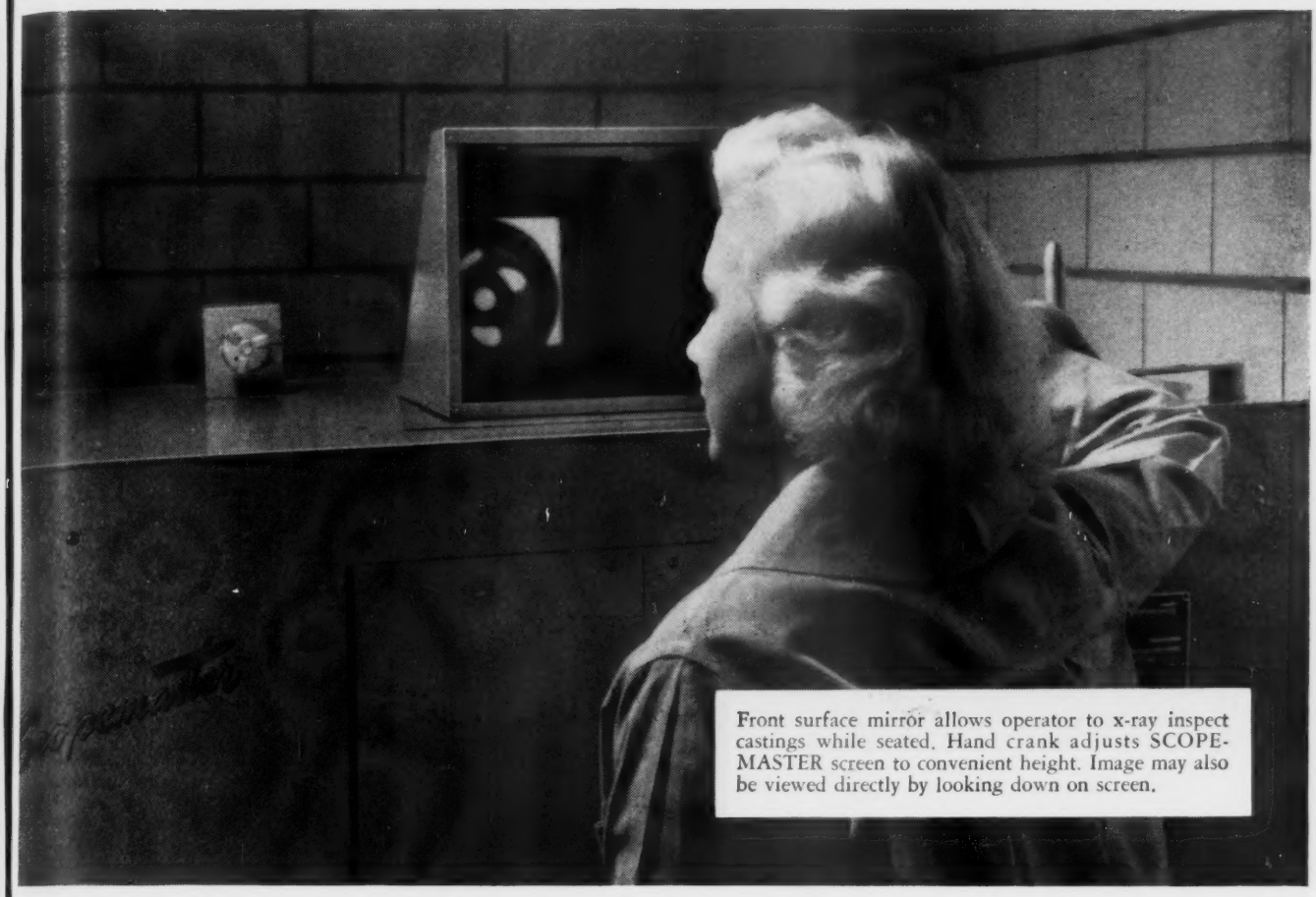
FREE HANDBOOK

Tells how and where to look for signs of inefficient bulk-materials handling . . . how to analyze, organize and set up an efficient handling system. Plus many useful tables and data. Write for "Bulk Materials Handbook."

SAY "HUFF"

PAYLOADER®

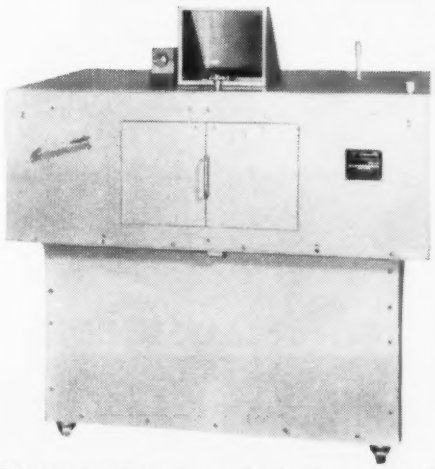
THE FRANK G. HOUGH CO. • Since 1920



Front surface mirror allows operator to x-ray inspect castings while seated. Hand crank adjusts SCOPEMASTER screen to convenient height. Image may also be viewed directly by looking down on screen.

Reduce costs! Use GE Scopemaster for 100% visual x-ray inspection

Provides more than ample sensitivity in high-speed examination of light-metal castings, molded plastics, intricate assemblies, etc.



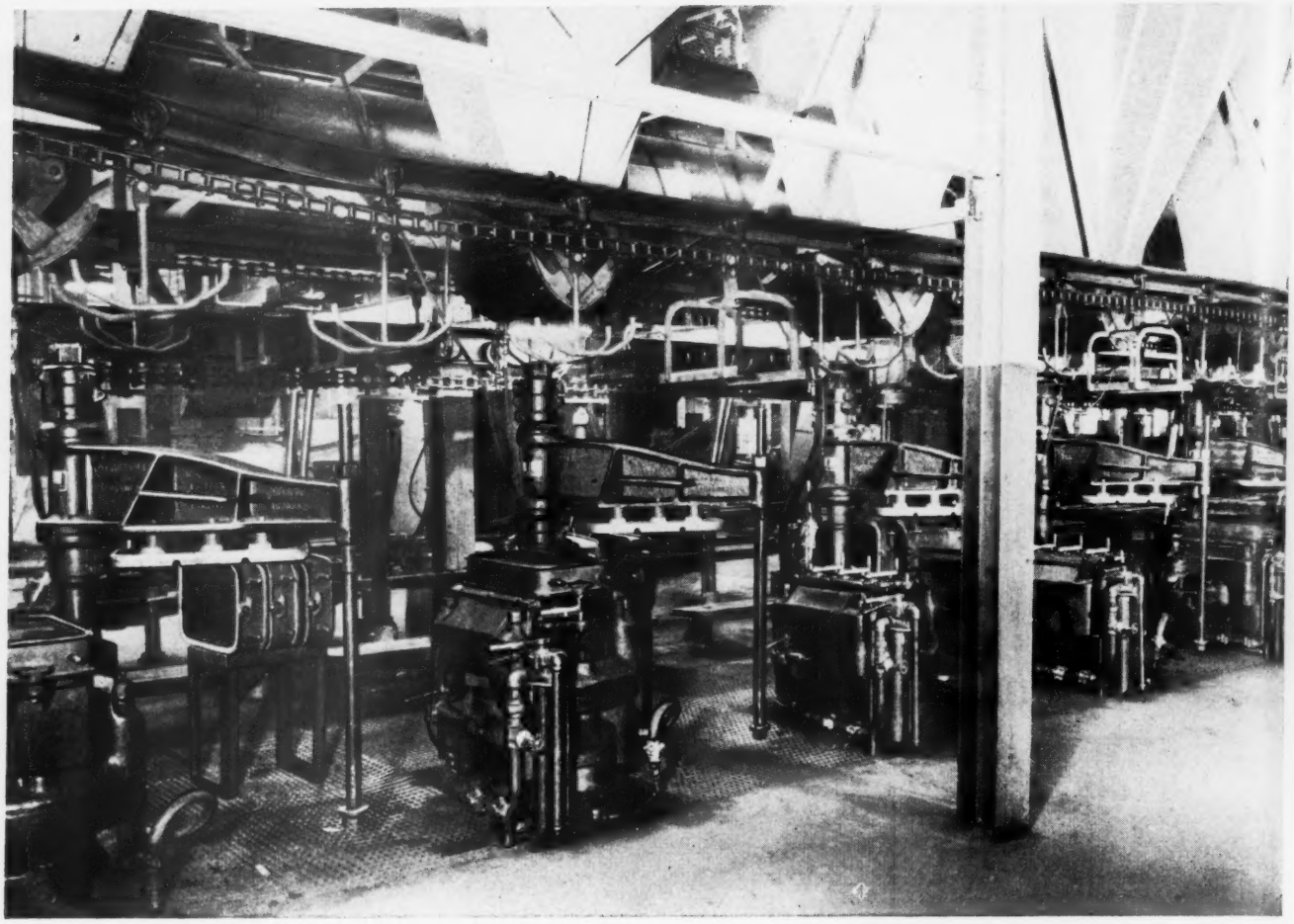
SCOPEMASTER's screen-object distance can be varied to magnify image, and a single control moves the sample longitudinally or transversely. Unit is fully protected for stray radiation.

100% fluoroscopic x-ray inspection can prove a valuable tool in your plant. Pioneered for the aircraft industry, the GE SCOPEMASTER saves producers and users of light metal alloy castings time and money in catching defective parts. The accuracy of its inspection is attested by its use on airframe castings where failure could cause a serious accident. It is vastly superior to sample inspection by other means, and costs are far lower than with any other method of comparable thoroughness.

Other jobs on which x-ray fluoroscopy has been successful include checking small electrical components for incomplete or improper assembly. In the molded plastics industry, it has helped establish manufacturing technics. And in the production of small ordnance items, it replaced destructive spot tests — salvaged 90 to 98% of lots that previously would have been rejected in their entirety.

The SCOPEMASTER is another example of how General Electric is harnessing x-ray to the needs of industry. If there's a testing or inspection trouble spot in your plant, x-ray may be the answer. Ask your GE x-ray representative for an evaluation, or write your requirements to X-Ray Department, General Electric Company, Milwaukee 1, Wisconsin, Rm. YY-12.

GENERAL ELECTRIC

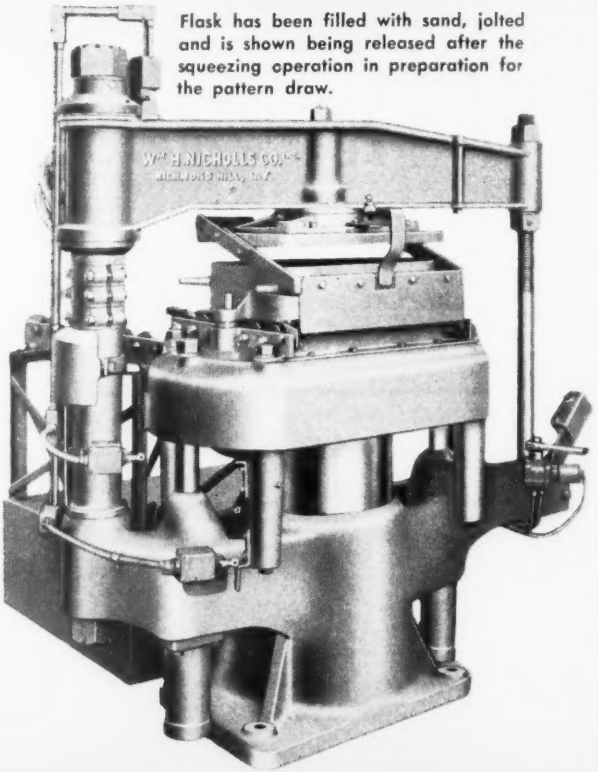


A BATTERY OF NICHOLLS MOLDING MACHINES IN A LARGE PRODUCTION FOUNDRY.

HEAVY DUTY Combination Jolt and Power Squeezer Molding Machines with pneumatic pattern draw and power operated self positioning parallel squeeze head, equipped with electrical controls for single push button automatic operation of jolt, squeeze, pattern draw and cross arm, including automatic sand strike-off, mold pusher and adjustable flask roll-off device.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL 18, LONG ISLAND, NEW YORK

Established 1910



Flask has been filled with sand, jolted and is shown being released after the squeezing operation in preparation for the pattern draw.

NICHOLLS

Packed in Bags and Shipped on Pallets

Each bag holds 25 lb. of contained vanadium, so additions can be made without weighing. Bags prevent contamination and are shipped on pallets for easy and economical handling.

Use this New, Easy Method

. . . FOR ADDITIONS OF VANADIUM

You can handle additions of vanadium conveniently and economically with ELECTROMET ferrovanadium packed in bags.

Check these advantages:

- *Convenient Packaging*—The alloy is packed in strong five-ply, paper bags. These bags have a wide blue band across the middle, as well as blue edges and bottom, for positive identification. The bags prevent contamination and preclude any chance of mix up with other alloys.
- *No Weighing*—Each bag (25 lb. of contained vanadium) can be added without weighing.
- *Handling Costs Reduced*—Pallet shipments are available at no extra charge. Each pallet holds about 4,000 lb. of ferrovanadium—2,200 lb. of contained vanadium. Pallets can be conveniently unloaded and handled in your plant by lift truck or overhead crane. Handling costs are reduced and inventory-taking is simplified. And you don't have to return the pallets.
- *High-Quality Material for Every Need*—ELECTROMET ferrovanadium is uniform in analysis, closely graded, correctly sized, and physically clean. It is furnished in four grades:

	Vanadium	Silicon max.	Carbon max.
High-Speed Grade	50 to 55%	1.50%	0.20%
Special Grade	50 to 55%	2%	0.50%
Open-Hearth Grade	50 to 55%	8%	3%
Foundry Grade	50 to 55%	approx. 10%	3%

* **Immediate Delivery**—Vanadium is readily available and can frequently be used in engineering steels to replace part, if not all, of certain scarcer alloys.

* **Engineering Service**—Our staff of experienced metallurgical engineers is always ready to furnish technical assistance in the use of vanadium. Phone, wire, or write one of ELECTROMET's offices for additional information.

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit
Houston • Los Angeles • New York • Pittsburgh • San Francisco

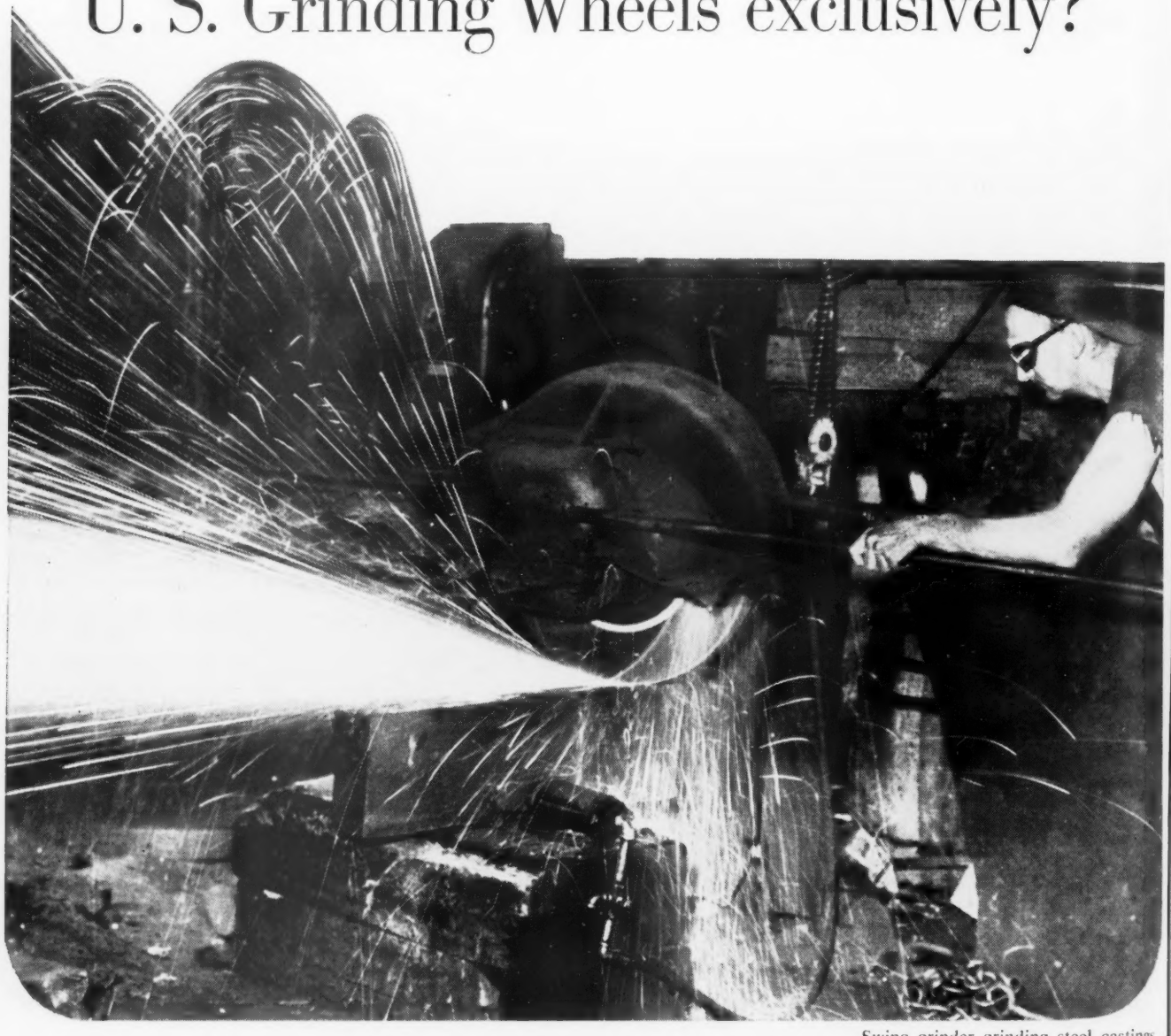
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet

TRADE-MARK

Ferro-Alloys and Metals

Why does this foundry use U. S. Grinding Wheels exclusively?



Swing grinder grinding steel castings, using U.S. Royalite® Wheels.

For stand, swing and portable grinders, this steel foundry in the East uses only "U.S." grinding wheels. Over a period of years, the management found that these wheels did a better job than the other makes used, permitted greater savings in time and labor. For this foundry, it's "U.S." wheels exclusively.

United States Rubber Company has been making grinding wheels for more than 89 years. In that time, "U.S." engineers have piled up such immense technical data and experience about bonds and abrasives that there is no snagging problem which they cannot handle quickly and with the highest efficiency. They will gladly show you how to economize on your own particular grinding operation. Write to address below.

Products of U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.

at last SHELL BONDING *without* CLIPS, STAPLES *or* GADGETS

New shell bonding fixture eliminates shell mold assembly problem, as well as finning or separation at the parting line.

Fixture also allows shell molding machine operator to set cores, assemble both halves of the shell for bonding together, without loss of time or use of additional help.

Write for additional information and prices.

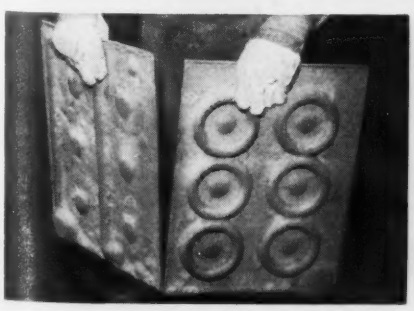
For Greater Efficiency in any Shell Molding Operation

SHELL PROCESS, Inc.

Manufacturers of Shell Molding Machines and Allied Equipment

342 McKinstry Avenue • Chicopee, Mass.

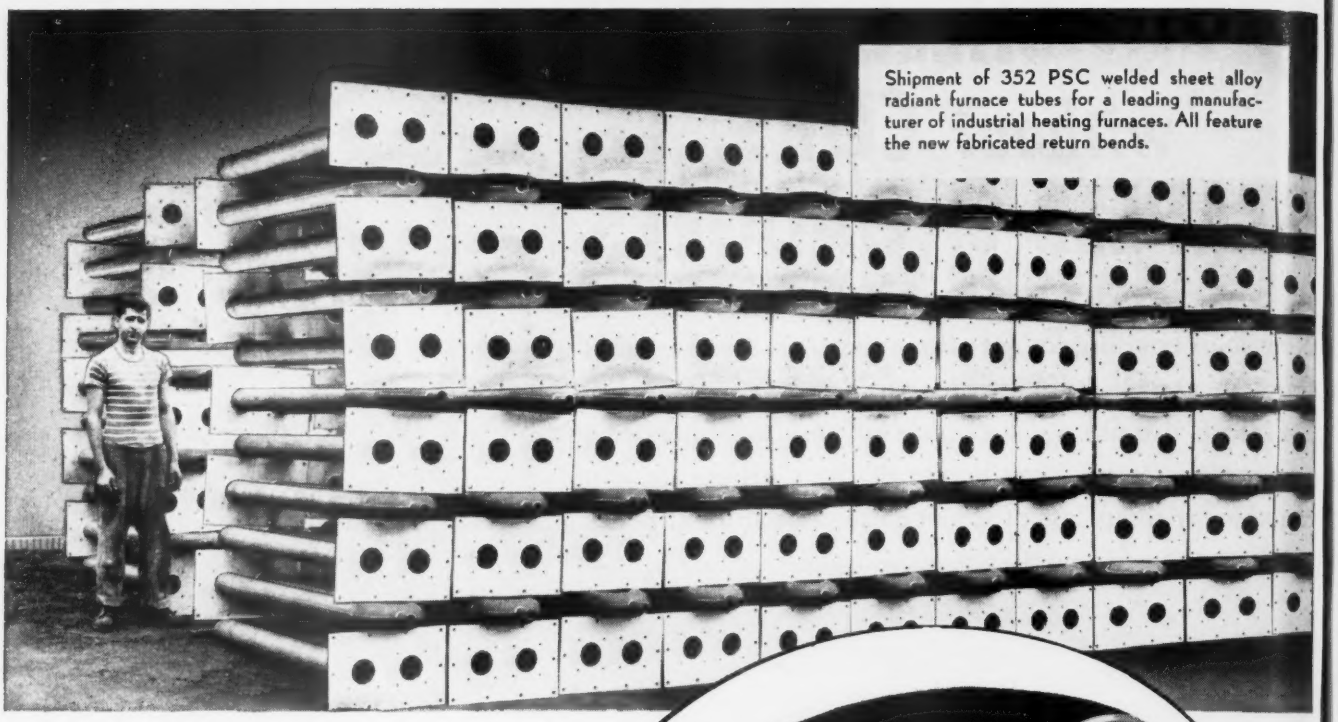
One Minute from SHELL MOLDING MACHINE TO BONDED MOLD READY FOR POURING!



1. Operator removes shell from molding machine and breaks in two, preparatory to placing on shell bonding fixture.

2. Placing cope in position after drag has been treated with bonding agent, automatically applied by fixture.

3. Finished shell as it looks after bonding. Shell is now ready for pouring. Horizontal, vertical or diagonal pouring possible.



Shipment of 352 PSC welded sheet alloy radiant furnace tubes for a leading manufacturer of industrial heating furnaces. All feature the new fabricated return bends.

PSC's *New* FABRICATED Return Bends

make radiant furnace tubes last longer

Here are three reasons why sheet alloy radiant furnace tubes equipped with the new PSC fabricated return bends are serving better: (1) Uniform wall thickness, and smoothness of interior result in uniform flow of gases; less cracking and burning out at the bends. (2) Light-wall construction saves heat-up time and fuel. (3) From 33 to 50% lighter than cast tubes: lower initial cost; lower freight cost (important for export); easier handling.

PSC precision-assembled tubes are standard on many models of radiant furnaces. Also a complete line of heat-treating containers and fixtures, of weight-saving sheet alloys of any type. Send blue prints or write as to your needs.

Send for CATALOG 52

THE PRESSED STEEL COMPANY
of WILKES-BARRE, PENNSYLVANIA

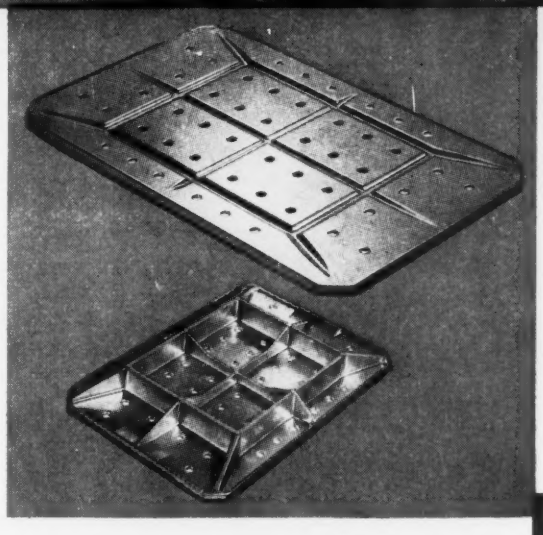
Industrial Equipment of Heat and Corrosion Resistant WEIGHT-SAVING *Sheet Alloys*

☆ ☆ ☆ OFFICES IN PRINCIPAL CITIES ☆ ☆ ☆

"Rejects have been reduced to an absolute minimum since using EDCO Dowmetal BOTTOM BOARDS"

says BOB PETCHER
FOUNDRY SUPERINTENDENT
JOSAM MFG CO., MICHIGAN CITY, IND

EDCO DOWMETAL Bottom Boards in use at Josam Manufacturing Company, world's largest manufacturer of plumbing drainage products



"Light, easy to handle, practically everlasting, EDCO DOWMETAL Bottom Boards have been a potent factor," says Petcher, "in improving our quality of castings and increasing our output.

"Our old wood boards had a life of about two weeks; and toward the end of their life-span, they always produced some poor castings which had to be rejected.

"EDCO Boards are just the opposite—they are *permanent equipment.* We've been using EDCO DOWMETAL Bottom Boards for more than four years—have used them almost 10,000 times—and they are still in perfect condition.

"These boards have paid for themselves many times over."

You, too, can save time, space and substantial cash sums by using EDCO DOWMETAL Bottom Boards.

They're easy to handle—light. They stack in small space, easily and securely. They last indefinitely—built for it.

Above all, like Josam, you get better castings, fewer rejects—a big saving.

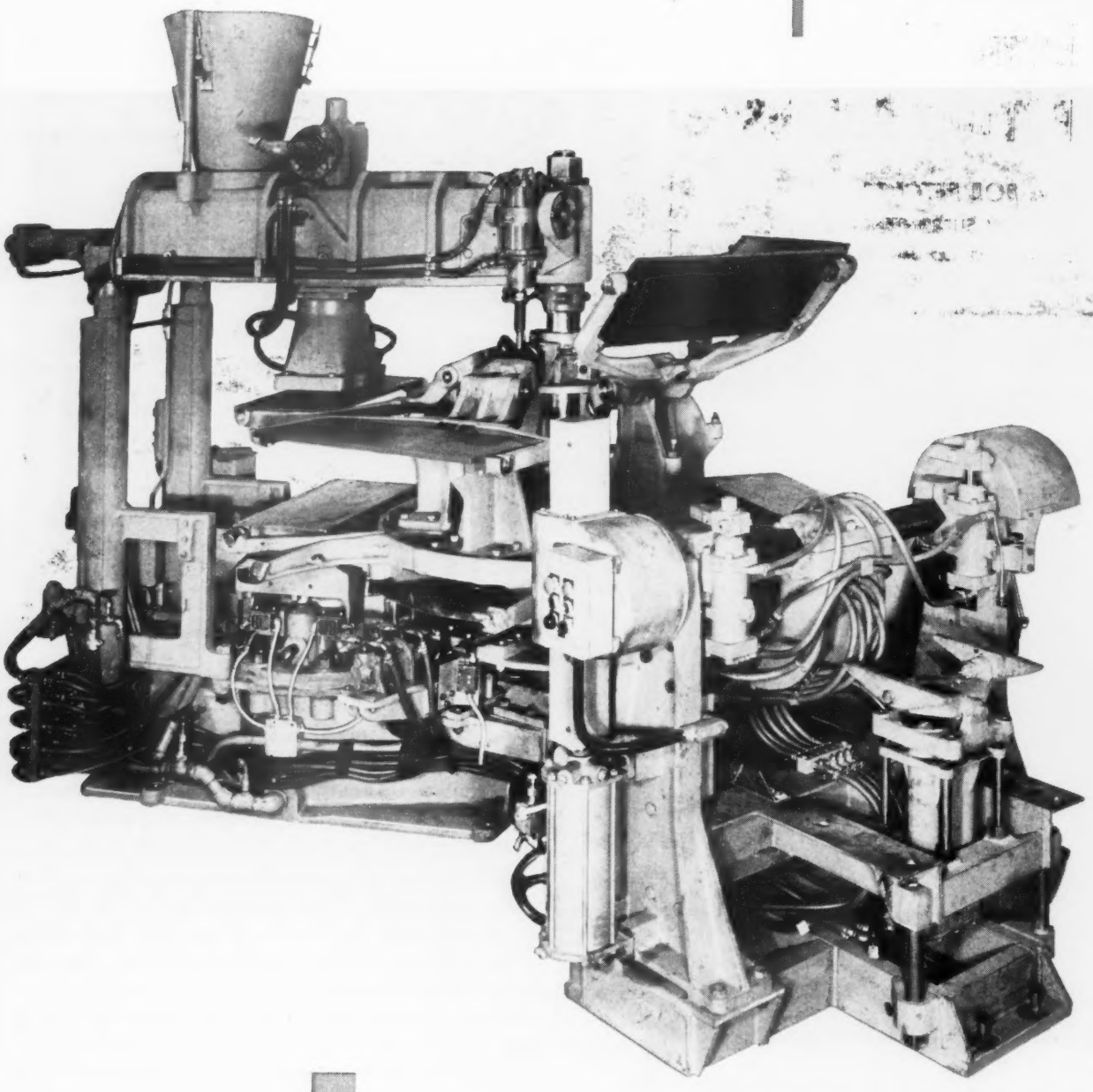
Write us, or phone MAnsfield 6-7330 for price schedule and list of 78 standard sizes available from stock.

CHRISTIANSEN CORPORATION

210 SOUTH MARION ST.
OAK PARK 1, ILLINOIS
ALUMINUM ALLOY INGOTS

WHY OSBORN'S ROTO-CORE CUTS CORE COSTS

This Automatic OSBORN Core Production Unit blows 5 different core boxes or 5 duplicate core boxes simultaneously. Many installations of OSBORN Roto-Core Production Units have yielded cost savings of 60% or more and are operating at rates exceeding 360 blown core boxes per hour.



The Osborn Roto-Core Automatic is a versatile machine combining the functions of three units . . . Core Blower, Five Station Turntable and Rock-over Draw Machine . . . into one fully automatic core blowing machine.

Accepted Standard

The Osborn Roto-Core method for blowing cores has become standard procedure in many foundries for economically producing long-run as well as short-run core production. Result . . . high quality cores consistently produced.

Continuous Operation

Roto-Core operates on a preset time cycle. It is stopped only when necessary to change a setup. Most jobs require the use of only two men. One man positions a dryer plate over the blown core preparatory to rocking over, the other removes the blown core. Core box is automatically cleaned and sprayed at make-ready station where core wires can be set if required.

Versatile

The standard Osborn Roto-Core machine is furnished with or without the Cope Handler, depending upon production requirements. When blowing five different cores on the machine, the Cope Handler is used to carry and position over each box a separate sub-blow plate. Each plate contains blow holes of proper size and position to suit its individual core box.

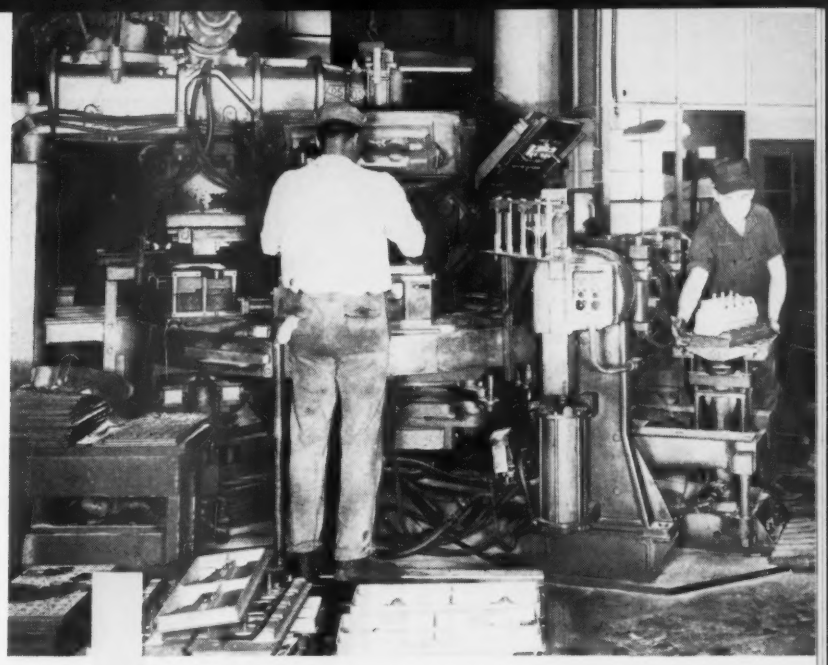
Easy to Set Up

The Roto-Core can accommodate a wide range of core box sizes. In many cases, existing core box equipment can be used. With an interchangeable floating platen design, core boxes can be changed over in less than three minutes, enabling the machine to operate with a minimum of change-over time.

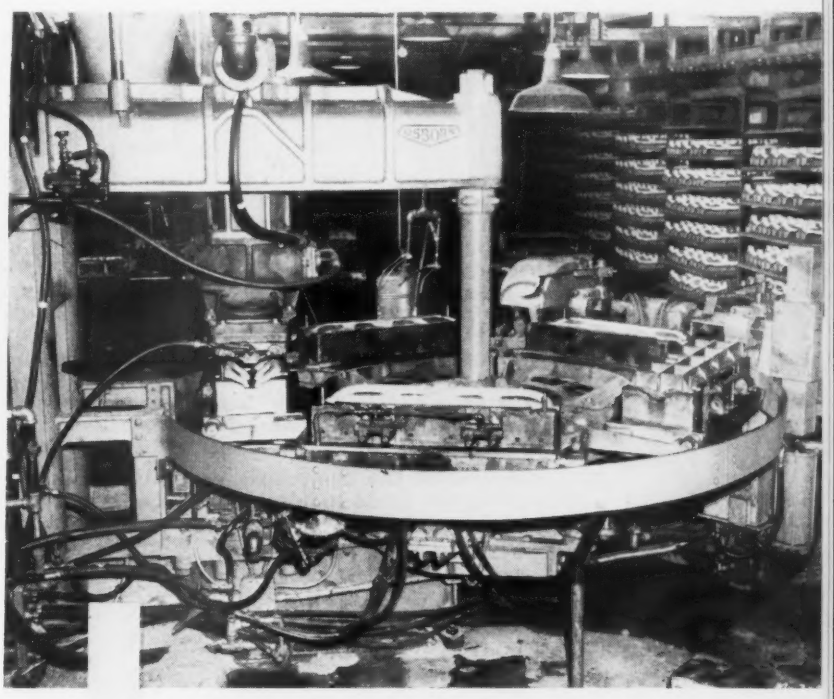
Details on the Roto-Core Automatic are available through your factory-trained Osborn representative or by writing: *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Ave.
Cleveland 14, Ohio

OSBORN
MOLDING MACHINES CORE BLOWERS



Producing Five Different Cores at one time. Roto-Core Automatic is equipped with Cope Handler. One man positions dryer plates . . . other man removes finished blown cores. Machine operates on preset time cycle.



Five Duplicate Core Boxes are blown simultaneously by Osborn Roto-Core Automatic. For work of this kind, Cope Handler is not used. Each core box above yields two manifold cores.

Another example of
Osborn leadership
and advanced engineering

Trainload of 48-inch flexible joint pipe leaving Bessemer plant for under water sewer construction. Freight cars were built by Pullman-Standard Car Mfg. Co., Bessemer, Ala.

Birmingham Welcomes GENERAL OFFICES OF

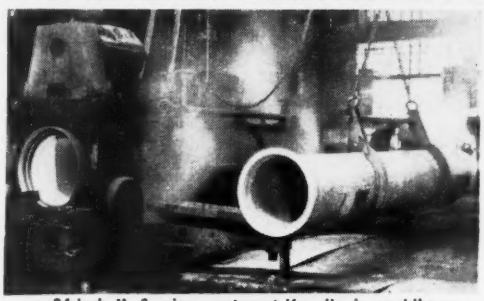
U.S. cast iron PIPE

UNITED STATES PIPE and FOUNDRY COMPANY

United States Pipe and Foundry Company is the nation's largest manufacturer of cast iron pressure pipe

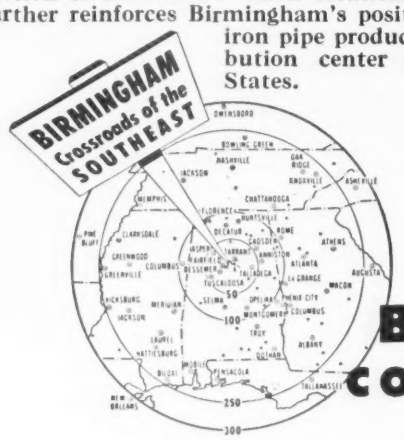
Two of its major plants are located in the Birmingham district—one in North Birmingham, the other in Bessemer. These modern plants produce pipe used throughout the country for water, gas, sewage and industrial services. All of it is cast from Birmingham made pig iron. This iron is produced principally from Alabama iron ore, coke and limestone. The company also has extensive facilities in the Birmingham district for the manufacture of pig iron, coke and coal chemicals, which were formerly those of the Sloss-Sheffield Steel & Iron Company. It has other pipe plants in Burlington, N. J.; Chattanooga, Tenn.; and Decoto, Calif., and maintains 15 sales offices in the U. S. A.

Removal of the company's general offices to Birmingham was made to administer its operations more efficiently and better serve its markets from this central section of the South. Their location in this district further reinforces Birmingham's position as the cast iron pipe production and distribution center of the United States.



24-inch U. S. pipe, cast centrifugally in rapidly revolving metal mould by machine at left.

Sloss City Furnaces of U. S. Pipe — two of four within city limits which produce pig iron for pipe manufacture and the foundry trade.



★ ★ ★ ★ ★ ★ ★ ★ ★ ★

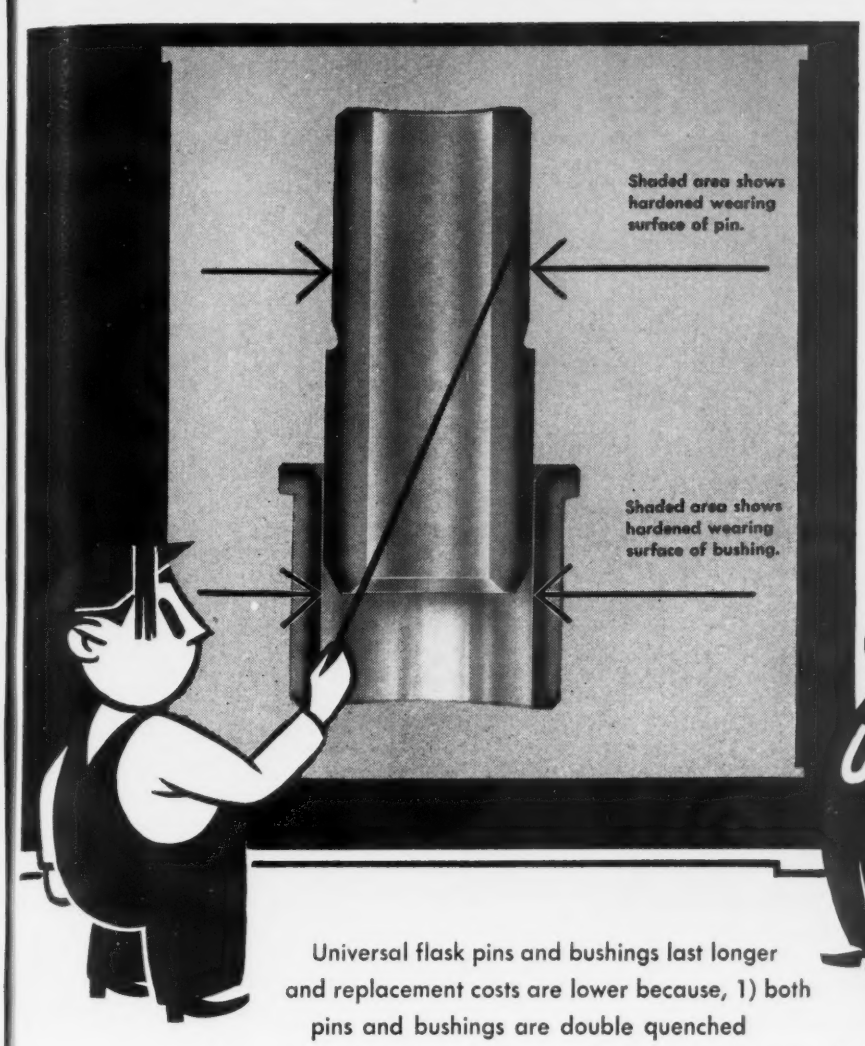
Birmingham's Committee of 100 welcomes the U. S. Pipe and Foundry Company's general offices to this fast growing area. It invites other enterprises to appraise the dominant advantages this district offers and will be glad to make factual and confidential surveys on request. Address inquiries to this Committee or any of its undersigned members.

BIRMINGHAM COMMITTEE OF 100

1914 Sixth Ave., N., Birmingham, Ala.

Executive Committee

Gordon Persons Governor of Alabama	Donald Comer Chairman Exec. Com. Avondale Mills	W. W. French, Jr. President Moore-Handley Hardware Co.	Claude S. Lawson President U. S. Pipe & Foundry Co.	E. L. Norton Vice Chairman Coosa River Newsprint Co.	Isadore Pizitz President, Pizitz	Frank E. Spain Attorney	John E. Urquhart President Woodward Iron Co.
John S. Coleman President Birmingham Trust National Bank	William P. Engel Engel Companies	Clarence B. Hanson, Jr. Publisher The Birmingham News	Thomas W. Martin Chairman of the Board Alabama Power Co.	J. C. Persons Chairman of the Board First National Bank	Pratt Rather President Southern Natural Gas Co.	Mervyn H. Sterne Sterne, Agee & Leach	A. V. Wiebel President Tenn. Coal & Iron Div. United States Steel Co.



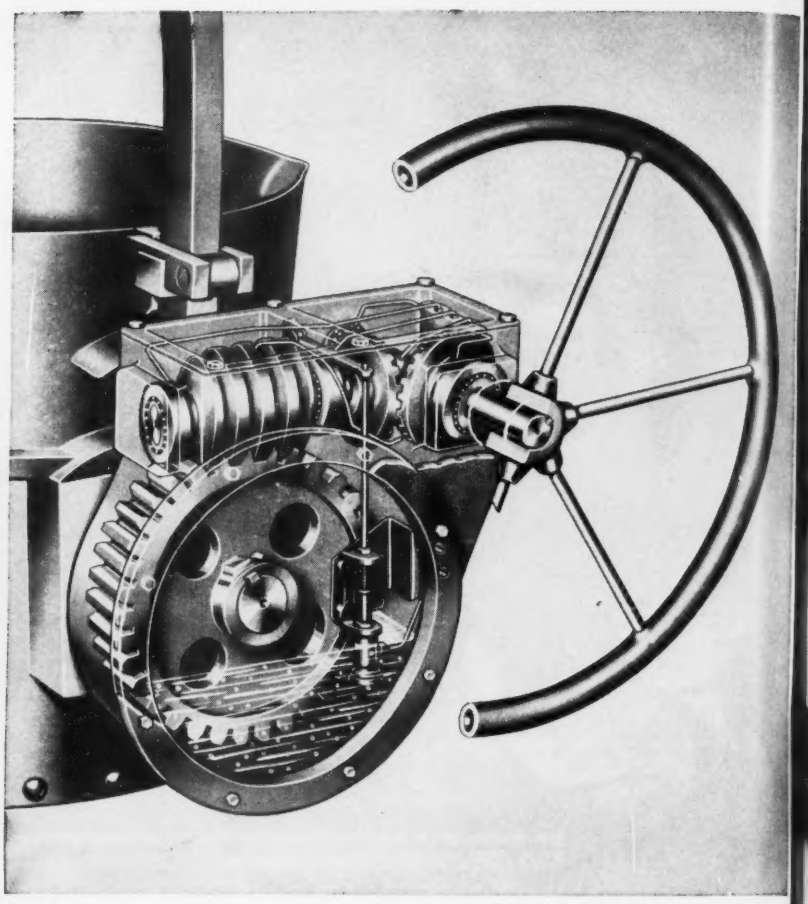
how the long life of UNIVERSAL flask pins and bushings saves dollars in your foundry operations

Universal flask pins and bushings last longer and replacement costs are lower because, 1) both pins and bushings are double quenched and double drawn to produce strong, ductile cores that can take rough treatment in the foundry without breaking or chipping and, 2) wearing surfaces are carburized and hardened to withstand wear. Universal flask pins and bushings are precision ground to insure instant, accurate alignment of cope and drag. For complete information, write to Universal Sales Engineering Co., 1060 Broad St., Newark 2, N.J.; 5035 Sixth Ave., Kenosha, Wis.; or the home office.

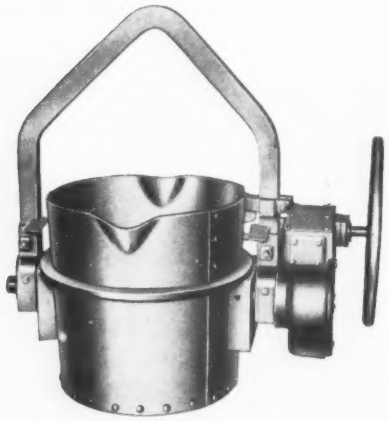
185

UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN

This Worm Ladle Gearing ELIMINATES GASKET ADJUSTMENTS



- **Completely enclosed and self contained**
- **Automatic force-feed lubrication**
- **Positively self locking in any position**
- **Precision cut gears**



Model 592T ladle with new type gearing. Also notice use of Industrial Equipment's much talked-about UNIVERSAL BAIL. This bail completely eliminates binding due to heat distortion or misalignment.

. . . WORM AND BEVEL GEAR ASSEMBLY COMPLETELY ADJUSTABLE

Here is another Industrial Equipment Company first . . . new, improved worm ladle gearing bringing *complete universal adjustability.*

Take a close look at the phantom view. Here is a one-piece, self-contained unit with all parts easily accessible. Your maintenance man can quickly make back-lash adjustments to pin-point accuracy and positive adjustment by adjusting the bearing lock nuts on all gears and worm. These nuts are easily reached and with working space to spare.

Unaffected by Heat

There is no connection between the bail and the gearing. No clearance for heat distortion is necessary, permitting an assembly almost to machine tool precision.

Industrial's new gearing is absolutely safe and positively self locking. The high ratio between worm and worm gear locks the ladle in any position. Incidentally, worm and bevel gears are of high tensile semi-steel and the worm is of high alloy steel. All are precision cut. Shafts are mounted on anti-friction bearings.

Now Standard Equipment

All Industrial geared ladles are now supplied with this outstanding new type of gearing. In addition, this gearing can be supplied for any Industrial worm geared ladles now in operation. *Write for details.*

Do you have our revised catalog No. 35?

Industrial
EQUIPMENT COMPANY

115 N. Ohio St., Minster, Ohio

LADLES • BOWLS • SHANKS • BAILS • TONGS • SPECIAL EQUIPMENT

Metals for the *Electrical Industry*

GLC GRAPHITE ELECTRODES help make many of the metals essential to the production, transmission and utilization of electricity.

The performance of **GLC GRAPHITE ELECTRODES** is unsurpassed in the manufacture of electric steels, foundry metals, ferroalloys and magnesium.

ELECTRODE DIVISION

Great Lakes Carbon Corporation

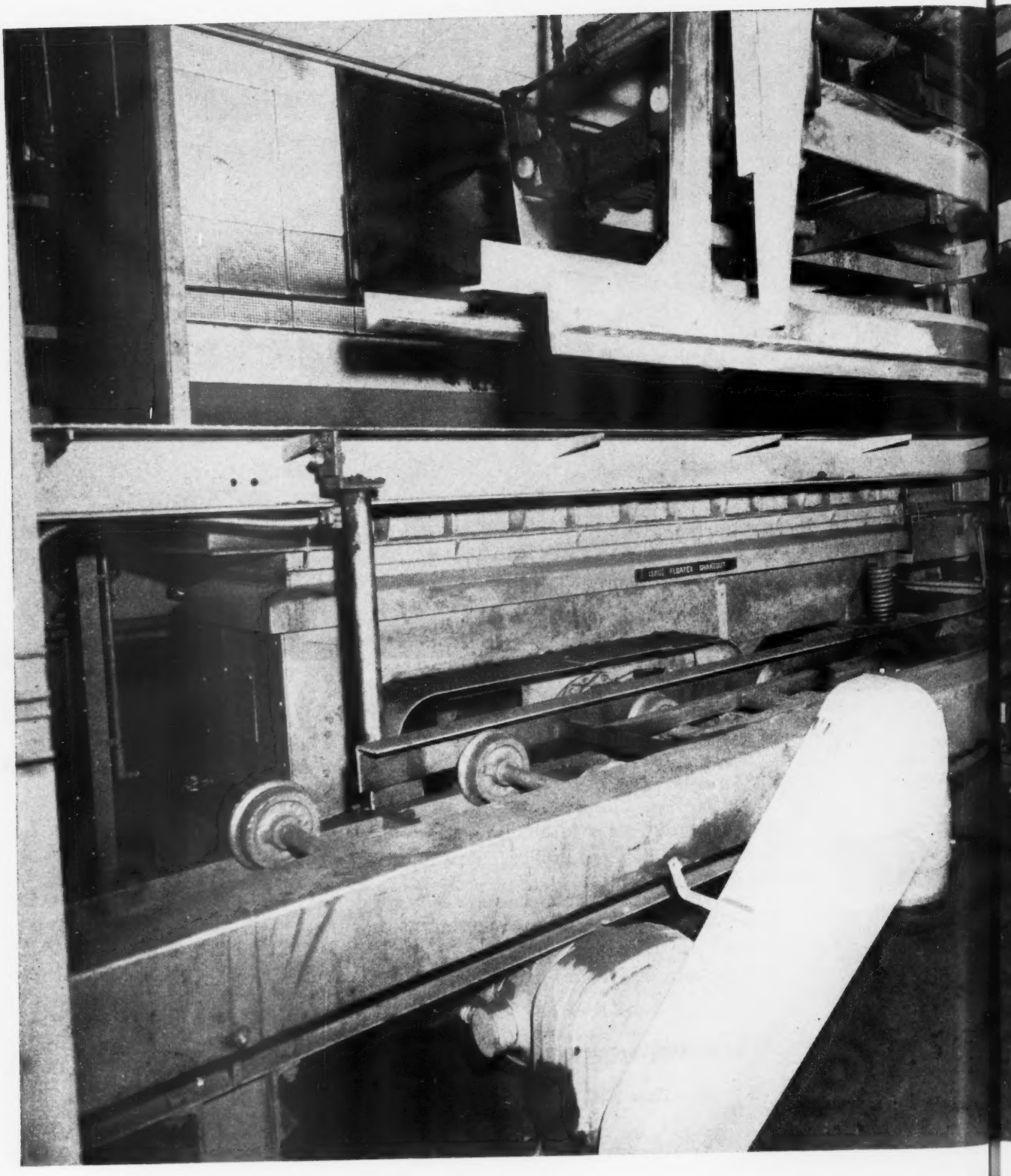
Niagara Falls, N.Y. GLC Morganton, N. C.

Graphite Electrodes, Anodes, Molds and Specialties

Sales office: Niagara Falls, N.Y. **Other offices:** New York, N.Y., Oak Park, Ill., Pittsburgh, Pa.

Sales Agents: J. B. Hayes, Birmingham, Ala., George O'Hara, Long Beach, Cal., Great Northern Carbon & Chemical Co., Ltd., Montreal, Canada.

Mechanization Pays Off



HEWITT-ROBIN

EXECUTIVE OFFICES, STAMFORD, CONNECTIC

ffat American Brake Shoe

EQUIPMENT: One Hewitt-Robins triple-deck 4' x 12' Floatex Shakeout and double-deck 30" x 85' 0" Vibrating Conveyor—Two Belt and Bucket Elevators —Three 20" and five 24" Hewitt-Robins Belt Conveyors.

LOCATION: Pomona Foundry of the Brake Shoe & Castings Division, American Brake Shoe Company, Pomona, California.

PERFORMANCE: Hewitt-Robins Floatex Shakeout with special triple deck construction simultaneously handles 10 flasks, rapidly cleans castings and separates sand. Castings are fed to top deck of vibrating conveyor, sprued and sorted. Chill blocks are also reclaimed while sprues discharge over end of top deck to tote boxes for salvage. Vibrating conveyor handles sand on lower deck to fine screen and lump-breaker for reduction and cleaning. Belt conveyors and Belt and Bucket elevators provide continuous flow of material for the sand system.

RESULTS: Only three men required to shakeout, sprue and sort 5200 castings per 8 hour shift . . . shakeout production per man hour greatly increased.

ENGINEERING DATA

Floatex® Shakeouts: Single units with decks from 2' x 2' to 8' x 10'. Multiple unit arrangements up to 16' x 33' and capacities to 300,000 lbs.

Vibrating Conveyors: 8" to 48" wide, up to 150' length with one drive. Capacity to 200 TPH of 100 lbs. cu. ft. material at horizontal setting. Carries hot-cold, dry-moist, fine-large, loose or packaged materials.

Belt Conveyor Systems: Engineered and Sectional . . . Engineered: designed to suit, level or high lifts, light or heavy duty, all components matched to service, widths 14" to 72". Sectionals: standard units from stock complete with all components, 24" and 42" deep trusses, widths 18" to 36", motors to 30 HP.

Belt and Bucket Elevators: Standard centrifugal widths 6" to 18", standard continuous widths 9" to 26".

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED PRODUCTS FOR YOUR FOUNDRY

- ☐ FOUNDRY SHAKEOUTS
- ☐ SSC UNIT

CONVEYORS:

- ☐ —Belt
- ☐ —Vibrating

BELTING:

- *☐ —Hot Materials
- *☐ —General Conveyor
- ☐ —Woven Wire

HOSE:

- *☐ —Air
- *☐ —Water
- *☐ —Steam
- *☐ —Fire
- *☐ —Twin-Weld®
- *☐ —Servall®
- *☐ —Water Suction
- ☐ BUCKET ELEVATORS
- ☐ MECHANICAL FEEDERS
- ☐ SAND SCREENS
- ☐ CAR SHAKEOUTS
- ☐ SCREEN CLOTH
- ☐ IDLERS
- ☐ BELT CLEANERS
- *☐ RUBBERLOKT® BRUSH

*For immediate information about these industrial rubber products, call your Hewitt Rubber Distributor. (See "Rubber Products" Classified Phone Book.)

Hewitt-Robins Incorporated
666 Glenbrook Road
Stamford, Connecticut

NAME

TITLE & COMPANY

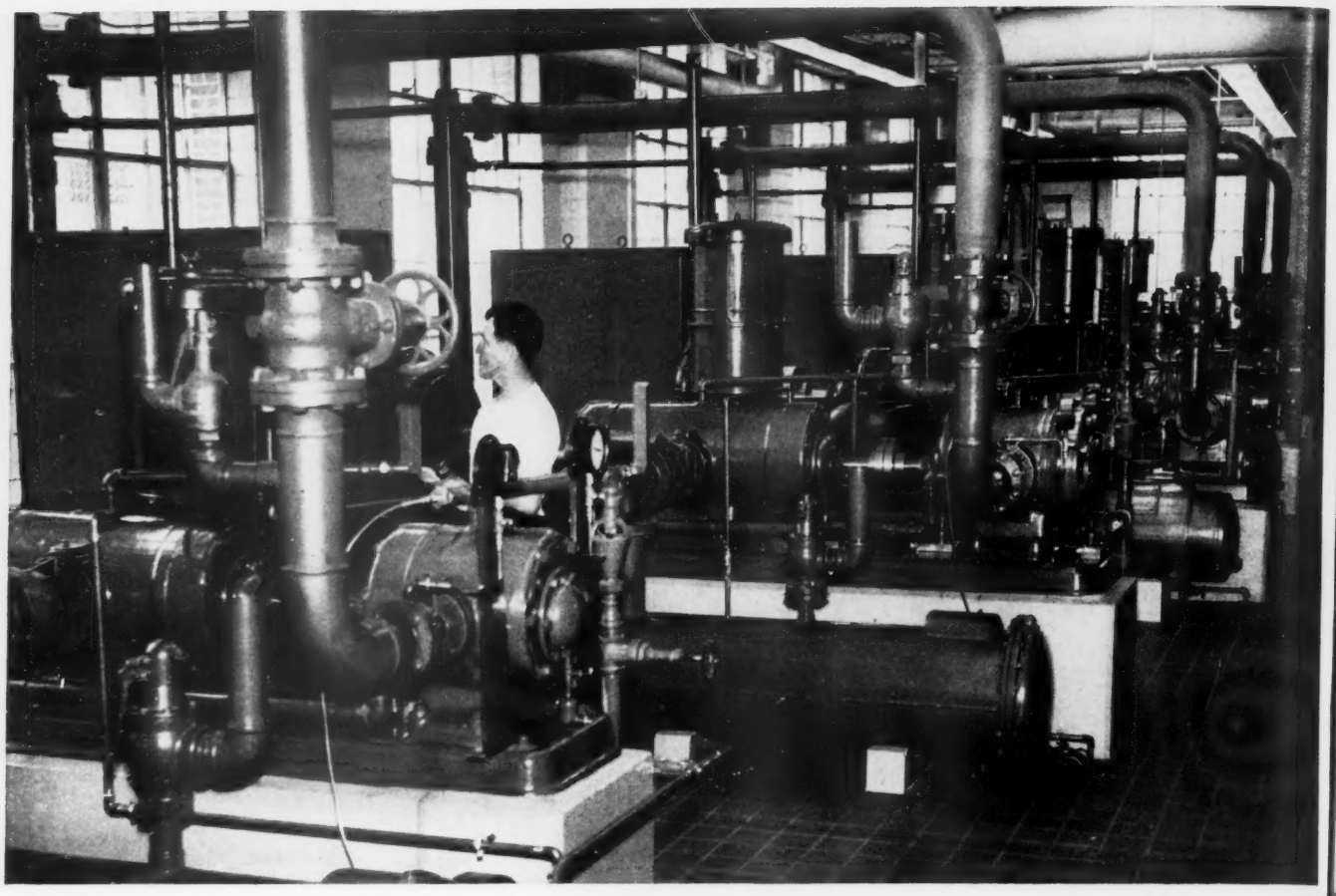
STREET ADDRESS

CITY PO ZONE STATE 1863

NCORPORATED

CTIC

DMESTIC DIVISIONS: Hewitt Rubber • Robins Conveyors • Robins Engineers • Restfoam
REIGN SUBSIDIARIES: Hewitt-Robins (Canada) Ltd., Montreal • Hewitt-Robins Internationale, ris, France • Robins Conveyors (S. A.) Ltd., Johannesburg • EXPORT DEPARTMENT: New York City.



mold Air Power to your needs as this founder does

Six Fuller Rotary Compressors work day after day at Textile Machine Works, Reading, Pa.

Compressed air, produced in one central location, is used for many foundry operations at Textile Machine Works, Reading, Pa., makers of full-fashioned hosiery machinery.

Many molding operations are mechanized at Textile Machine Works, using compressed air. Sand supply-hopper gates are opened by compressed air, jolt-squeeze machines operate with compressed air, pattern plates are removed from molds with air—sand blasting, core making, compacting flask sand, handling push-pallet plates—a whole group of foundry operations simplified by the use of compressed air supplied by Fuller Rotary Compressors.

Starting with a two-stage Fuller Rotary Compressor in 1943, this company has added more compressors as production was increased, until recently the sixth unit was added, supplying a total of 6800 cfm at 125 psi. Each addition was a Fuller Rotary Compressor, a sure indication of reliability and economy of operation.

In your own foundry or process operations, compressed air can save time and money—especially when it is supplied by reliably efficient Fuller Rotary Compressors. Don't overlook the advantages of ***air power***—put it to your work—write now for complete information.

Fuller

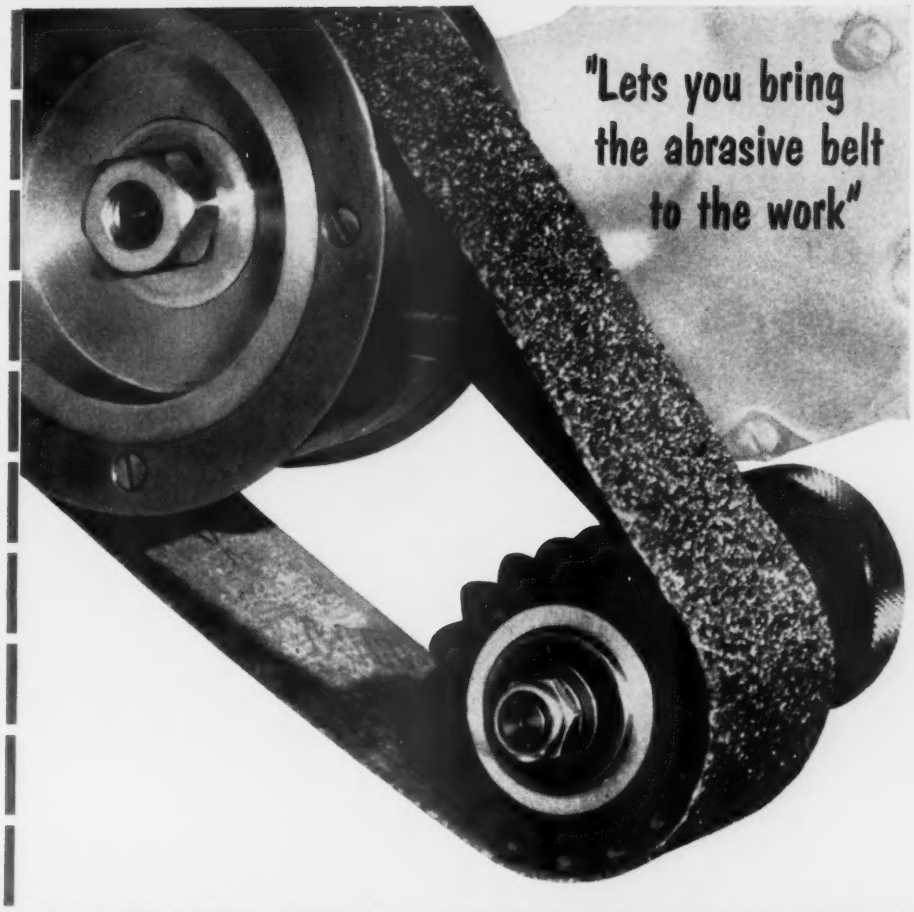
Pioneers of high-efficiency vane-type rotary compressors

FULLER COMPANY
Catasauqua, Pa.

Branch Offices: Chicago • San Francisco • Los Angeles • Seattle • Birmingham

C-236
2046

Grind FASTER with BELTS ...at less cost!



4 MODELS "61" Port-A-Belt GRINDING ATTACHMENTS

TRADE MARK

"Production costs cut up to 50%...finishing time reduced as much as 60%", report users of CARBORUNDUM's "PORT-A-BELT" Grinding Attachments and CARBORUNDUM® Abrasive Belts. You may find, as many have, that converting your straight-spindle grinders into fast, efficient belt grinders will reduce costs even more than 50% on such varied jobs as weld grinding, small-radius cleaning and polishing, or finishing convex or concave surfaces. Four sturdy models, built to take more than normal shop abuse. Your choice of 4"x2" or 2"x1" contact wheels—mounted on the tool spindle or on the extended arm.

All four "61" PORT-A-BELT attachments are equipped with CARBORUNDUM's "61" serrated rubber contact wheels. Used with CARBORUNDUM Abrasive Belts, these wheels give smooth, rapid cutting... no bounce or chatter. Belts last up to twice as long because they don't load up as fast. One operation often replaces two or three conventional finishing operations.

CALL YOUR CARBORUNDUM DISTRIBUTOR OR SALESMAN, listed in the yellow pages under "Abrasives," and find out how you can apply the versatility and economy of belt grinding to your production jobs. Or send the coupon.

SEND TODAY!

THE CARBORUNDUM COMPANY
Dept. F 82-38
Niagara Falls, New York

Yes! I'd like to know more about the "61" PORT-A-BELT Grinding Attachments.

NAME AND TITLE

COMPANY

STREET AND NUMBER

CITY ZONE STATE

by CARBORUNDUM

REGISTERED TRADE MARK

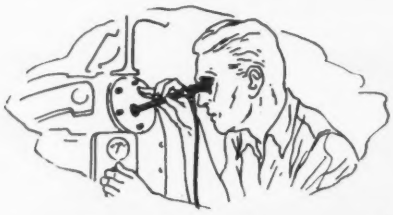
...continually putting more cents in your abrasive dollar!

82-38H

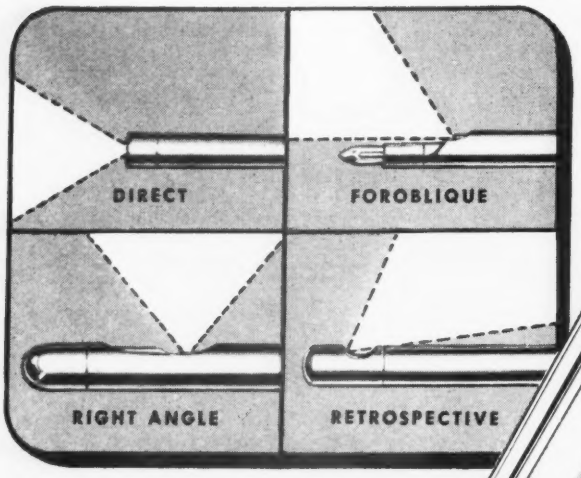
INSPECTION OF CONFINED AREAS FACILITATED

NECESSITY OF DISMANTLING AVOIDED

TIME SAVED—MONEY SAVED



A.C.M.I. BORESCOPES



A.C.M.I. Borescopes are available in 4 angles of vision (as above)— in diameters of .120" to 4.00"— in lengths of 4" to 720". Special models for special problems.

The A.C.M.I. Borescopes permit close-up visual examination of interior areas and surfaces not otherwise visible. They save time and money, and prevent costly dismantling, by providing a practical solution to a wide variety of inspection problems.

In maintenance and inspection work, on small internal bores, machine parts or castings, to large boiler tubes, chemical plants, process equipment, or other industrial installations, an A.C.M.I. Borescope may be the answer to *your* problem.

Each Borescope is a compact, self-illuminated industrial telescope of highest quality, employing a precision optical system, that produces a flat visual field. Lens systems are fully corrected for color, spherical aberrations, and coma, with all lens surfaces coated to increase light transmission.

Write for free informational folder, or tell us your problem.

American Cystoscope Makers, Inc.

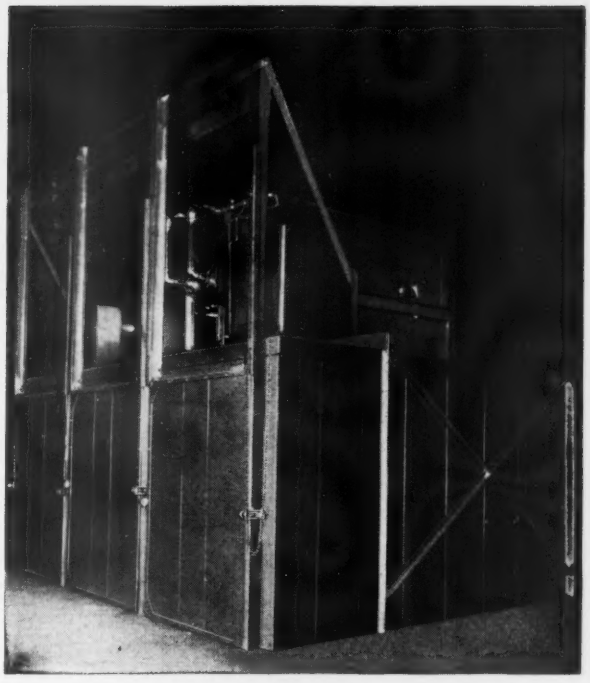
1241 LAFAYETTE AVENUE NEW YORK 59, N. Y.

A LOT MORE THAN FANS DUCTS, HEATERS AND PANELS GO INTO . . .

LANLY FOUNDRY OVENS

The proper adaptation and utilization of the essential component parts in every LANLY OVEN for maximum operating efficiency and economy, is a certainty being proved every day in foundries throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better foundry ovens.

Upon receipt of information covering your needs, we will submit a proposal for an oven that will be thoroughly guaranteed as to construction and performance.

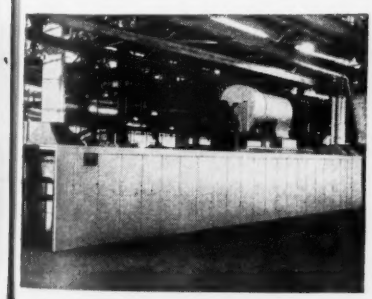


3 COMPARTMENT RACK TYPE OVEN

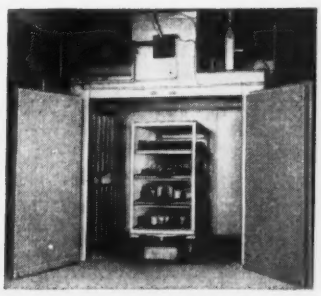
Uniformally heated by one compact, high capacity, air heater serving all compartments. Each compartment accommodates two core racks 4'-0" wide x 7'-0" long x 6'-0" high, loaded end to end.

Three Compartment Rack Type Oven

Lanly Car Type Oven



Continuous Core Blacking Oven



De-waxing Oven

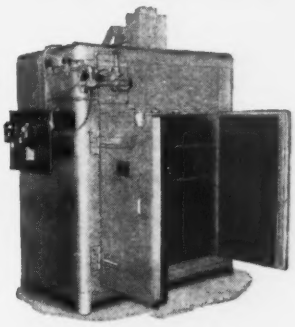
Combination Rack and Drawer Type Oven

Plaster Mold Drying Oven

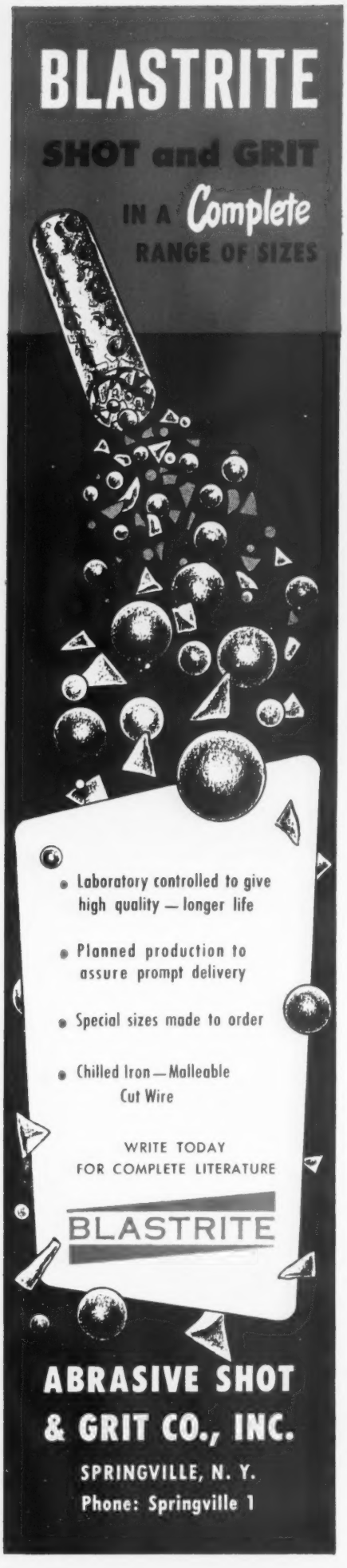
LANLY FOUNDRY OVENS

THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO

WRITE FOR THE LATEST CATALOG AND FACTS ON ANY INSTALLATION



Shelf Type Core Oven



Readers' Comment

Spur to Capital Improvement

TO THE EDITORS:

The reduction of activity and planning for plant modernization, rehabilitation and replacement of worn-out or obsolete facilities is one that should concern all of us.

In spite of the fact that the foundry industry recognized the need for mechanization and motorization to produce its product competitively and spent large sums of money for capital equipment during the past ten years, many, if not all our foundries—including many that have mechanized operations—are badly in need of extensive (expensive, also) programs to permit increased production per man-hour and reduce use and waste of costly materials.

Many programs are indefinitely postponed because the taxes have been such that without accelerated depreciation, the foundry cannot accumulate, from earnings, the funds required to carry out the project.

Our experience with foreign countries, particularly Switzerland and Canada, indicates a more realistic approach by these countries which, in the case of Switzerland, has resulted in a never-ending program of plant and equipment rehabilitation which has kept the country competitive in world markets when all raw materials must be imported and 85 per cent of production exported. Even so, the Swiss are feeling the competition of Germany in world markets served by plants financed with our money. Needless to say, our industry is suffering from this same kind of competition also.

In the need for additional revenue to replace that "lost" by the scheduled decease of the excess profits tax, there has been much discussion of an excise tax at the manufacturer's level. Such a tax, without an offsetting incentive to spend money for capital equipment, will in my opinion, result in a further decline in capital goods programs.

On the other hand, if in addition to an excise tax at the manufacturer's level, a program of accelerated depreciation is provided, allowing the manufacturer to write off up to 60-80 per cent of the cost of the facilities as rapidly as he wishes (at the manufacturer's option) during a period up to five years, it is my considered opinion that we would see a capital investment program even greater than that of the past five years. Such a program is fundamental if we are to maintain our standard of living, and continue to produce at prices that will maintain our markets on a competitive basis.

I believe experience indicates we cannot have a high level of employment, wages, etc., unless we have an active capital goods program. It is our experience that the need in industries, other than the foundry, is equally great for a modernization, replacement and rehabilitation program. Such a program would, I believe, increase the over-all tax collections and keep our industry strong and in a healthy, competitive position.

LESTER B. KNIGHT
President
Lester B. Knight & Associates Inc.
600 W. Jackson Blvd.
Chicago 6

* * *

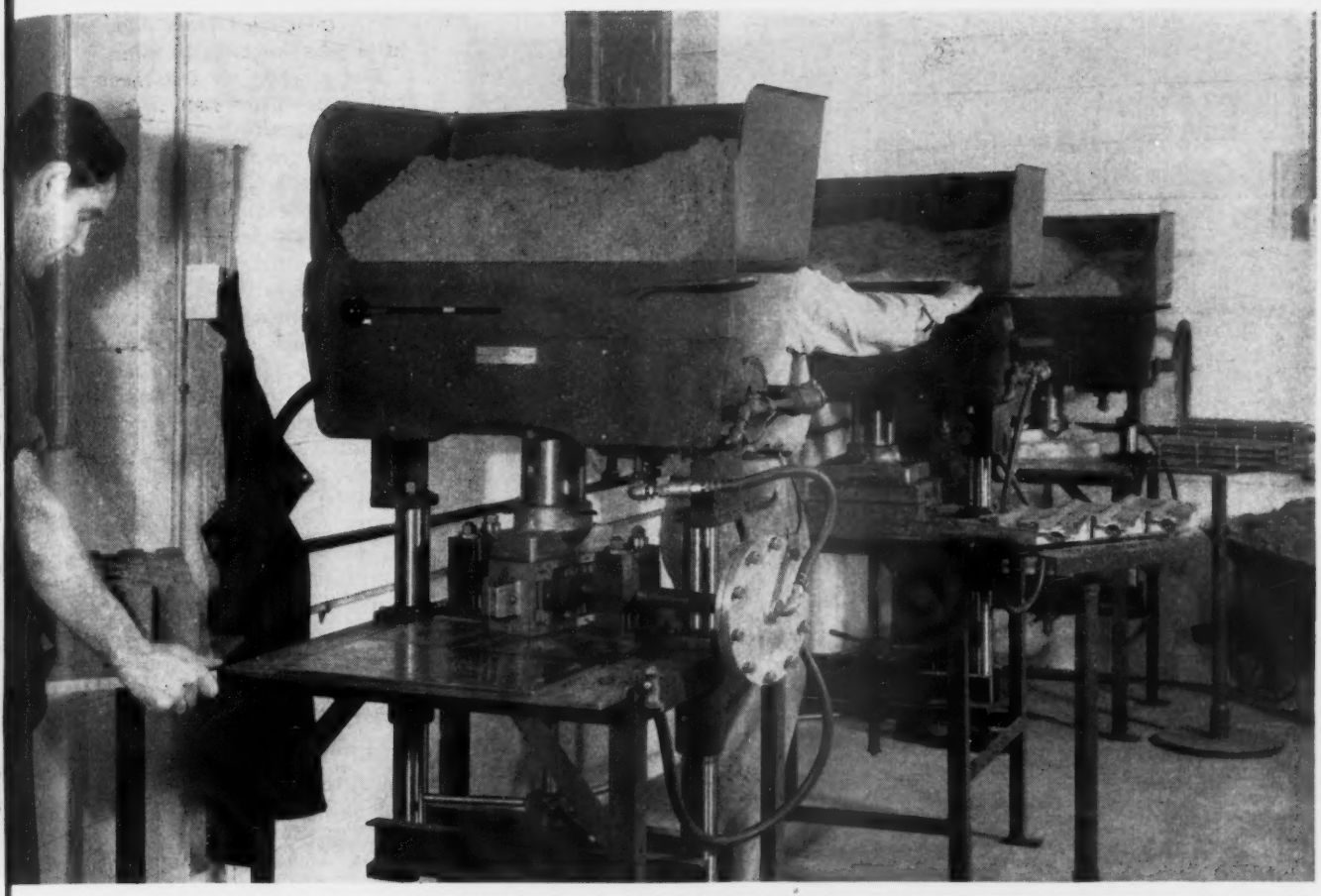
Wants Less Science Fiction

TO THE EDITORS:

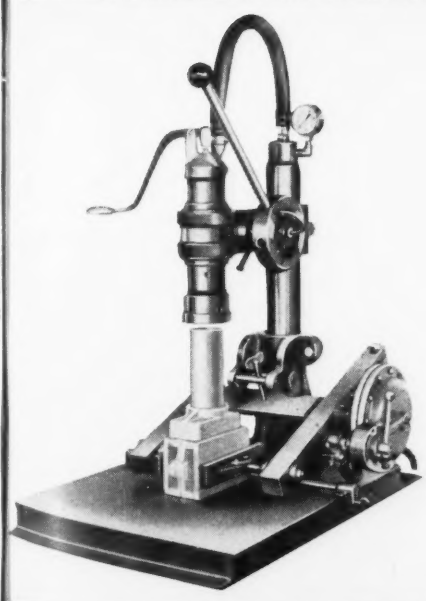
I would like to take the liberty of suggesting that you get a few members of your editorial and advertising staff to re-read page 194 of the October issue of FOUNDRY, which points out that most foundries are small potatoes. I would even venture to suggest that next year's survey be further broken down to determine the number of foundries that have less than eight employees. Another feature of the survey that might be revealed is the number of foundries which are owner-operated.

I have been an avid subscriber to FOUNDRY for the past two years but have often felt left out by ambitious articles on mechanization, super mechanization and super-duper mechanization. Such articles have the appearance of science fiction and are of little real interest to the smaller shops, which often manage to get along with little more than a heap of sand and a melting pot. Many a time we leafed through our copy of FOUNDRY to find that Ralph Lee's "Man to Man" article on his foundry was the only one that pertained to us at all. Even the advertisements are usually way beyond us. In most cases we use the ads only indirectly, writing to the advertisers for their recommendations on who can do the

(*Concluded on Page* 98)



REDFORD *No. 2 Stationary Magazine Type* CORE BLOWER



NEW features and functional design permit maximum production with a minimum of effort . . . Accepted in hundreds of foundries as the most efficient machine for the production of cores up to 5 lbs.

Write for Specification Bulletin "F".

Redford Cartridge Type Bench Core Blower

REDFORD
IRON & EQUIPMENT CO.
20733 Glendale Detroit 23, Mich.
Phone KEnwood 1-8611

- **The original small core blower.**
- **Proven simplicity—Speed and Flexibility.**
- **Makes cores up to 2 lbs.**
- **Thousands in use.**
- **Write for Bulletin "G".**

Here's a Handy Chain for Positioning Loads

• The short links in this 125 Endweldur ACCO *Registered* Sling Chain can be wrapped around small projections and over sharp corners. The greater tensile strength of the alloy material permits use of light weight chain that is easy for the machine operator to handle. The two 6-foot legs can be used as a double bridle, double choker, or in a double basket hitch as illustrated.

This is only one of many types of ACCO *Registered* Sling Chains available for lifting castings, sheet steel, pallets, machines, machine parts, quenching baskets, and the like. You can get AMERICAN Sling Chains as small as ¼" or as large as 1¼"—with sling, grab, or foundry hooks—or special hooks for plates, etc. They are all individually proof-tested, registered, and an identification ring is permanently attached.

See your AMERICAN CHAIN distributor today or write our York, Pa., office for copy of DH-130

ACCO

TRADE MARK

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

American Chain

(*Concluded from page 96*)

little jobs we have in mind.

For a while we felt meek and self conscious—little fish in a big pond. Now that the facts are again revealed in your survey, we feel more assertive and would like to demand less science fiction and more down-to-earth articles on plain old foundries like Ralph L. Lee's. To be specific let's have more on: Permanent mold practice, *small* shop layout, work simplification, time and motion in the foundry, scrap melting technique, tools, jigs and fixtures in the foundry, and in short any subject that can be discussed intelligently while staying within the $5000 bracket.

We are only vaguely interested in problems that can be solved by spending $1,000,000. Anyone who has that much has no problems.

H. B. DIETER JR.

D & H Foundry
1402 *East Fifth St.*
Austin, Tex.

* * *

Poor Examples of Safety

TO THE EDITORS:

On looking through the October issue of FOUNDRY—and I have picked many valuable items from your magazine—I noticed several illustrations which I would like to call to your attention.

I know that the American Foundrymen's Society is very active in foundry safety and I also recall several articles published by your magazine FOUNDRY.

The illustrations I refer to appear on pages 107 and 114 dealing with pouring metal without the use of eye protection. The other illustration is an advertisement on page 153 illustrating chipping tools.

Please bear in mind this letter is written in a constructive manner. I want to add that quite a number of the illustrations dealing with hot metal show the employees using eye protection.

H. N. RAHN
Plant Safety Engineer
Ingersoll-Rand Co.
Phillipsburg, N. J.

* * *

Nonferrous Foundry Practice

TO THE EDITORS:

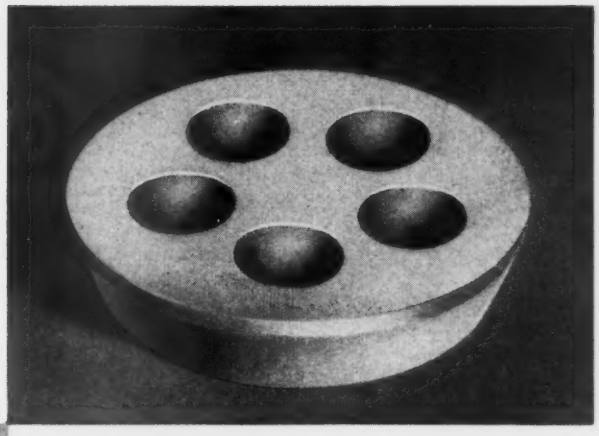
Your August issue of FOUNDRY has an article entitled "Things To Watch in Nonferrous Foundry Practice." This was an excellent article and I would appreciate your forwarding me three copies of reprints.

C. W. SCHILTZ
Tyler Specialty Co.
Tyler, Tex.

ALSiMAG® Ceramic STRAINER CORES

Specially Developed by Ceramic Experts to

ELIMINATE HANDLING BREAKAGE —WITHSTAND MOISTURE —RESIST HEAT SHOCK



AlSiMag 564 (White)

An economical material which easily withstands pouring temperatures of iron, aluminum, bronze, brass, and similar metals.

Now your foundry can forget shop-made sand core problems — breaking, crumbling, slowed-down production, sand washed into castings, and all the rest! AlSiMag Ceramic Strainer Cores are made of special compositions developed after years of research. They will not break in handling, will not erode at any normal pouring temperatures, substantially speed production, make big savings right down the line! Don't let obsolete sand cores rob your foundry — order . . .

AlSiMag CERAMIC STRAINER CORES

AlSiMag 202 (Tan)

Special heat shock resistance. Excellent for all metals with exceptionally high pouring temperatures.

COST LESS PER CORE!

As a result of our extensive high speed production facilities and years of specialized experience, AlSiMag Ceramic Strainer Cores actually cost *less* in most instances than shop-made sand cores!

TEST THEM IN YOUR OWN FOUNDRY

Try AlSiMag Strainer Cores — let your own experience tell the story. Test samples of standard sizes free on request. 14 standard sizes — write for free Bulletin 532. Samples made to your specifications at moderate cost.

Write Dept-D

AMERICAN LAVA CORPORATION

A SUBSIDIARY OF MINNESOTA MINING AND MANUFACTURING CO.

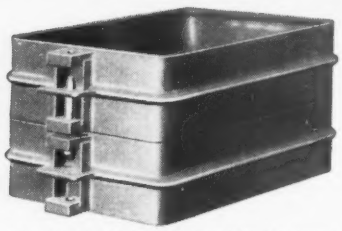
CHATTANOOGA 5, TENNESSEE

52ND YEAR OF CERAMIC LEADERSHIP

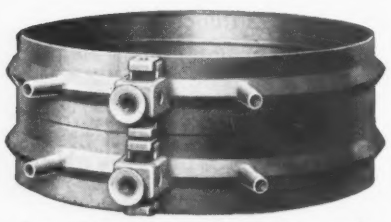
REPRESENTATIVES:

M. A. BELL CO., 217 Lombard St., St. Louis Mo. • 3201 Sherman St., Houston, Texas • 3430 Brighton Blvd., Denver, Colo. • CANADIAN FOUNDRY SUPPLIES & EQUIPMENT LTD., 4295 Richelieu St., Montreal 30, Quebec • 49 Main St., Toronto 14, Ontario • FIRE BRICK ENGINEERS CO., 2400 S. 43rd St., Milwaukee 1, Wis. • E. J. WOODISON CO., 7415 St. Aubin Ave., Detroit 11, Mich. • 146 Chandler St., Buffalo 7, N. Y. • FRED H. McGEE, 120½ E. 7th St., Chattanooga, Tenn. • SMITH-SHARPE CO., 117 27th Ave., Los Angeles 58, Calif. INDIANA PRODUCTS CO., 400 Union Bank Bldg., Kokomo, Ind. • HOFFMAN FOUNDRY SUPPLY CO., 1193 Main Ave., Cleveland, Ohio • EASTERN FOUNDRY SUPPLIES, INC., 109 Frelinghuysen Ave., Newark 5, N. J. • FOREMOST FOUNDRY SUPPLY CO., 645 N. Pine Ave., Chicago, Ill. • SPRINGFIELD FACING CO., N. Chicopee St., Willimansett, Mass.

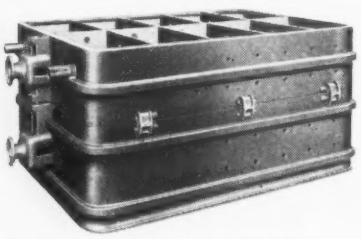
Adds YEARS to the Life of a Flask!



Style "AD" Flask with Double Pin Lugs.



Style "BLDT" Flask with Trunnions and 2-man Lift Handles.



Heavy Duty Flask, style 3/8 ND-RTX cope and 3/8 NS-RT drag, with clamping bars and clamps.

Every Sterling Flask is carefully fabricated from special hot rolled steel channel having a tensile strength of 70,000 lbs. The steel also has controlled carbon content and copper bearing . . . features that add years to the life of the flask, even under tough everyday usage. This construction gives you the practical combination of maximum strength with minimum weight. It assures accuracy and speed in molding. Check these distinctive Sterling features: All-steel welded into one solid, rigid piece . . . A rib rolled in the center of each section to resist torsional and other strains . . . Heavy rolled steel sand flanges with square corners and full width bearing . . . Partings accurately machined, not just surface ground, but planed to an accuracy of .005". And there's plenty of metal left for re-machining if necessary. Frankly, can you think of any other foundry flask that gives you so many life-prolonging features?

Consult Sterling when in need of foundry flasks or other foundry equipment.

Sterling

WORLD WIDE SERVICE

STERLING WHEELBARROW CO.
Main Office and Plant • Milwaukee 14, Wis., U. S. A.
Branches and Dealers in Principal Cities

Subsidiary Company
STERLING FOUNDRY SPECIALTIES, LTD.
London, Bedford and Jarrow-On-Tyne, England

Manufacturers of Foundry Equipment for Almost Half a Century

A 7272-1P-CR

Keep the Scrap at Home!

Just before the attack which brought World War II to the United States, the State Department sanctioned the exportation of large tonnages of scrap metal over the protests of much of the metalworking industry and especially some of the nation's leading metallurgists.

When war struck, we found ourselves exceedingly short on a sufficient supply of high-grade scrap to meet needs of foundries and mills engaged in war production. This shortage continued throughout the war and became critical again during the Korean war.

But even more important, the exported scrap was used by our enemies to make guns and shells. Our armed forces suffered severely when this metal was returned as shells and shrapnel. Many believed the policy which permitted the exportation of scrap at a time when international tensions were rising was little short of criminal.

One would think that Washington might learn a lesson from this previous disastrous experience, but perhaps that is asking too much. Ferrous foundrymen were startled and greatly disturbed when the Department of Commerce recently announced the removal of all restrictions on the exportation of ferrous scrap during the fourth quarter, both as to quality and quantity. This action was taken in the face of unanimous opposition by the Scrap Consumers Advisory Committee, which, unfortunately, has only one representative from the foundry industry although ferrous foundries consume approximately one-fourth of purchased scrap sold. Nevertheless, vigorous protests from foundrymen, especially on the Pacific Coast and from the Alloy Casting Institute, Gray Iron Founders' Society, Malleable Founders' Society and Steel Founders' Society of America, have made the position of the ferrous foundry industry very clear to those concerned in Washington.

The industry feels strongly that good grades of ferrous scrap should not be exported. Such scrap constitutes an important resource that only recently was in short supply, and undoubtedly again will become critical in any emergency.

Restrictions should be placed immediately on the exportation of good grades of scrap, and these restrictions should be continued in 1954.

This nation should not play the part of the sucker for a second time.

Frank G. Steinbach

Editor

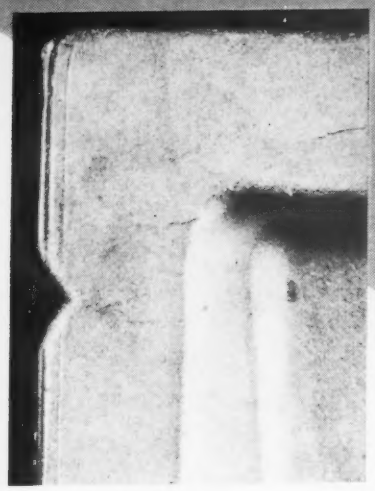


Fig. 1—This casting is marred by the misrun apparent at left

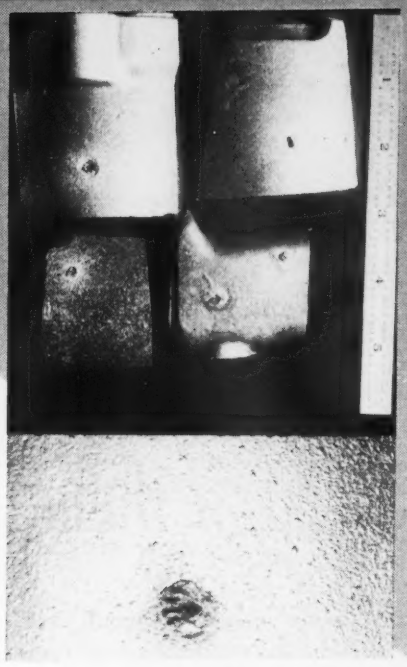


Fig. 2—Sand explosions resulted from relatively large, isolated foreign inclusions in the sand

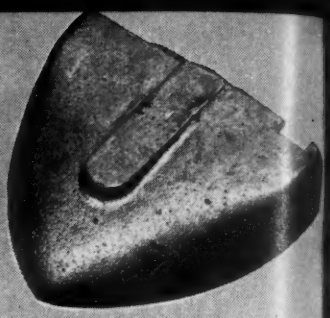


Fig. 3—Steam explosion of the small clay balls in the sand shown in Fig. 4 caused pitting

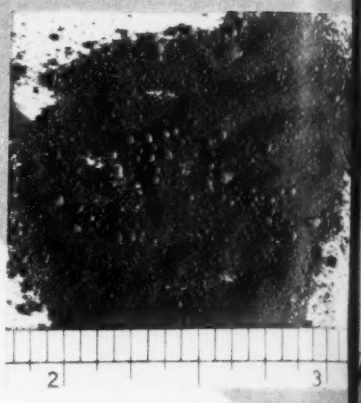


Fig. 4—Clay balls in air-dried molding sand caused surface pits on the casting in Fig. 3

How to Avoid Trouble in the ALUMINUM FOUNDRY

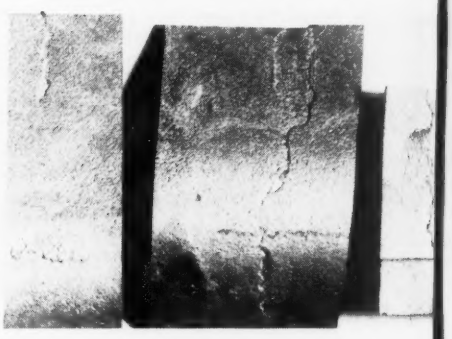


Fig. 5—Sand buckling at high temperatures causes sand lines, or rat tails

By DONALD L. LaVELLE
American Smelting & Refining Co.
Barber, N. J.

SOME of the more common troubles that beset foundrymen casting aluminum can be avoided with virtually no expense. The only requirement is rigid adherence to a set of "Do's" and "Don'ts" that metallurgists and practicing foundry people have proved by long experience to be right.

Almost invariably, when trouble is encountered in a foundry that is supposed to be following the "Do's" and "Don'ts" faithfully, investigation will show that somebody decided to by-pass a precaution because "I never used to do it that way" or, "It was too much trouble." But as so many of us used to say when we were kids, "Cheaters come to provings." They do in the foundry, too.

As in many other kinds of shops, knowing how to avoid trouble in the aluminum foundry depends, to a great extent, on knowing the nature of at least the most common types of casting difficulties. This means being able to recognize casting defects and their probable causes. In this article no attempt will be made to analyze or lay down precautions to be taken against *all* the troubles that can plague alumi-

Fig. 6—When the sand expands before the metal in the mold has solidified, sand buckles like these are the result

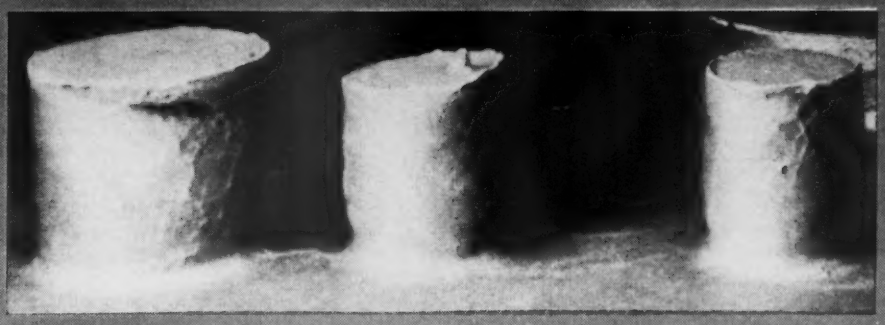


Fig. 8—Soft ramming of the mold produces weak sand. In turn, that condition produces swelling of the casting when the metal is poured

Fig. 9—Top shows sand holes. Below is a projection formed by a hole in a core

Fig. 10—Iron contamination of the alloy caused the coarse, crystalline, brittle fracture that is visible in this casting

Fig. 7—Loosening of a poorly adhering layer of sand causes a sand scab

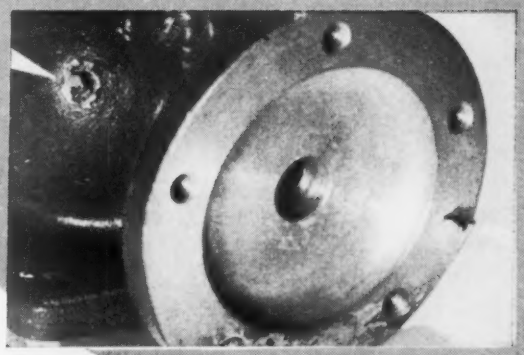


Fig. 11—Satisfactory when it was machined and painted, this small casting later developed these two blisters, which are the result of dross and flux

num founders. That would be impossible. Only the most common types of defects will be covered.

Defects Due to Molding and Pouring Practices— Flaws on the surfaces of castings are usually caused by some condition arising outside the metal proper. Often such defects are tolerable because they do not adversely affect the performance of the casting. This is particularly true where the cast parts are ultimately painted, anodized or otherwise covered, or where nobody cares what they look like. But where a fine finish is desired, surface defects must be corrected.

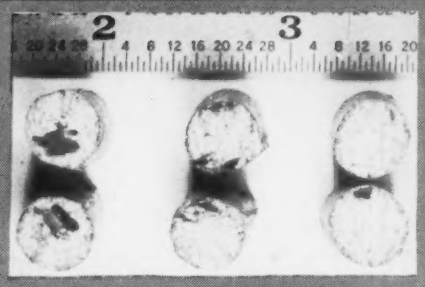


Fig. 12—Test bars show the presence of dross inclusions

Fig. 15—In this casting, the flaw is a hot crack

Fig. 13—Top, blows caused by moisture; below, a chill

Fig. 14—Top, a collapsed blow is shown on a machined surface; below, it has been opened by fracturing

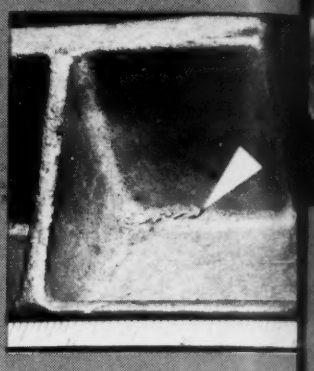


Fig. 18—Shrinkage at the junction of light and heavy sections resulted in this crack

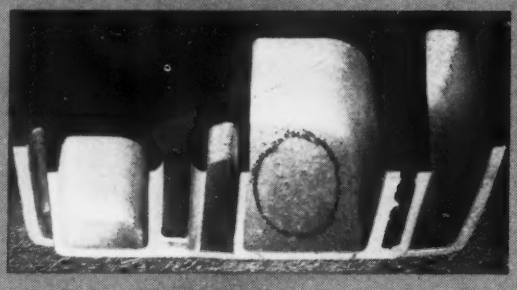


Fig. 17—Pouring this thin casting with only one gate resulted in the shrinkage shown here

Fig. 16—Quenching the casting in cold water caused this quench crack

Fig. 20—Shrinkage cavity from lack of riser on heavy section

Fig. 19—Surface shrinkage was caused by metal poured at a high temperature

Misruns—Prime among surface defects is the misrun, a condition wherein the metal fails to fill the mold. It usually occurs in the form of a hole or an incompletely filled edge, (Fig. 1).

Misruns occur for one of two reasons: Either the metal is poured at too low a temperature to assure complete distribution throughout the mold cavity before it solidifies, or the metal is prevented by back pressure, by inadequate sprues, runners and gates,

Fig. 21 — Shrinkage cavity from inadequate riser

Fig. 22 — Dissolved gas caused various degrees of pinhole porosity on the machined surfaces

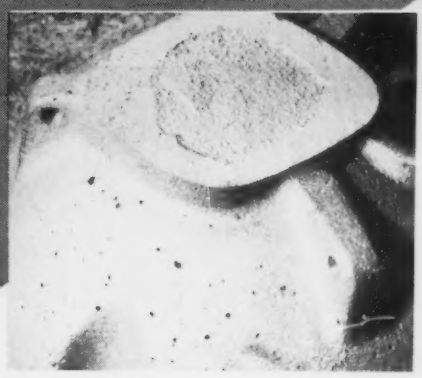


Fig. 23—Two types of porosity are visible in this illustration. Where the casting was cut with a saw, pinhole porosity appears. Where it was sandblasted, there is trapped air bubble porosity

or by some obstruction from getting to all the places it is supposed to go.

To prevent misruns, it is obvious that the first step is to pour at the proper temperature. A pyrometer will help.

In addition, check the sand for improper grain fineness distribution, excess moisture or too-hard ramming. All of these will reduce permeability, and consequently will prevent trapped air and steam from being vented. If not vented, the back pressure thus caused can be sufficient to slow or stop the metal flow and thus cause a misrun.

With thin-walled castings or pieces with large flat areas, it is advisable to insure adequate and rapid venting by piercing small holes through the cope surface from the mold cavity.

Less frequently, misruns are caused by fluctuation in the rate of metal flow during pouring. To avoid this, maintain a smooth, uniform and nonturbulent entry of the metal into the sprue system.

Sand Explosions—Small voids or craters containing sand or other foreign matter and located on the surface of a casting are commonly called sand explosions. They are of two types, each with a different cause and each demanding a different tactic for prevention.

The isolated sand explosion is generally caused by a large inclusion of foreign matter in the sand. This foreign matter may retain a great amount of oil or moisture which, when struck by the molten metal, will generate steam or gas with explosive rapidity. This explosion causes the crater, (Fig. 2).

The best way to preclude such trouble is obviously to keep the sand clean. This is often difficult because the particles of foreign matter that can cause such explosions are frequently smaller than the finest sand screens available in most foundries. Thus, it is again obvious that the best precaution is to be sure that no foreign matter gets into the sand. If there is any doubt about its purity, discard it entirely.

The more uniformly distributed pits or craters occur when the clay content of the sand has collected into clay balls and is no longer uniformly distributed throughout the sand. The greater part of the moisture content of the sand will then tend to concentrate in these clay balls. Hence, when those on the surface of the mold come in contact with the molten metal, steam will be suddenly generated which will produce numerous small craters on the surface of the casting, (Fig. 3).

The cure is clearly to get rid of these clay balls. Casual inspection of a sample of sand from the sand heaps may fail to reveal them, but if the sample is spread out and allowed to dry, the balls will show up plainly.

In the sample of sand shown in Fig. 4, the clay balls were found to comprise 14 per cent of the weight of the sand. Although the clay content of the sand as a whole was 3.3 per cent, the balls had a clay content of 10 per cent while the rest of the sand contained only 1 per cent clay. In other words, 45 per cent of the clay was concentrated in the 15 per cent of the sample made up of the clay balls, while the remainder of the sample lacked enough clay to mold properly. Hence, the molder tended to use more water than should have been required, but this merely aggravated the defective condition still further.

While complete removal of these clay balls from the sand is difficult, it is possible if the sand is allowed to dry completely. They then become fragile and are easily broken up by any mechanical churning of the

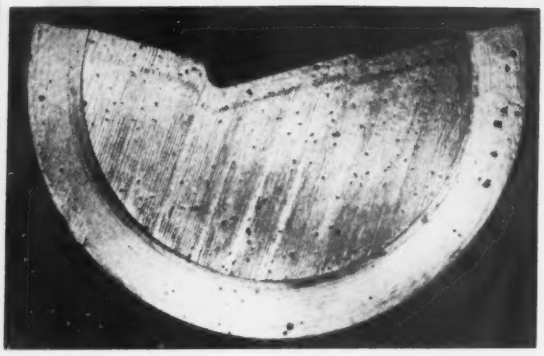


Fig. 24 — A saw-cut section reveals bad pinhole porosity

Fig. 25—Reaction porosity occurred just beneath all surfaces of these castings

Fig. 26—Steam evolution in the mold caused this porosity, which follows the contours of the blades

Fig. 27 — Severe porosity created by steam generated in a wet mold

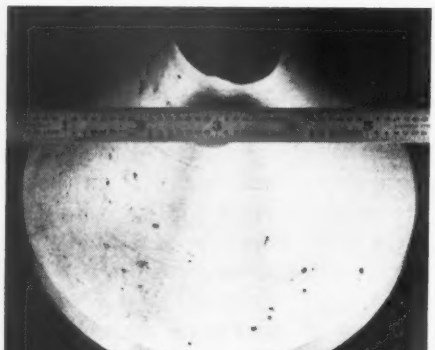


Fig. 28—The air and dross porosity shown here results from severe agitation during pouring

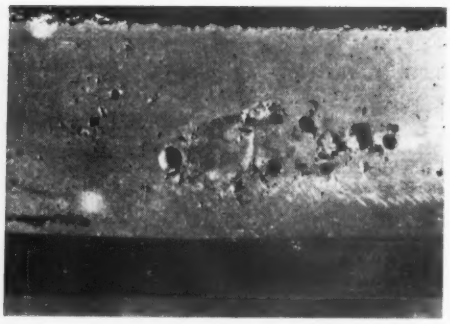


Fig. 29—Defects present in this casting include air bubbles and dross inclusions in the gate area

sand. If drying is not feasible, the most direct cure for sand explosions of this sort is to renew the sand.

Sand Lines, or Rat Tails—These irregular lines on the surface of a casting, produced when the metal on either side of the line is of different heights, are caused by the failure or buckling of the sand surface at elevated temperatures, (Fig. 5). They are most frequently found on large thin-walled areas. They are a surface phenomenon only and do not indicate any internal or subsurface unsoundness.

While the exact cause of these defects is not clearly understood, there are many explanations offered: High moisture content, low permeability, low green strength, and low resilience of the sand—all these are regarded as somehow related to the occurrence of sand lines.

Sand Buckles—These well defined depressions on the surface of a casting, with a sharp line running longitudinally at the bottom, are produced by the buckling or expansion of the mold surface at elevated temperatures, (Fig. 6). The properties of the sand mold causing this defect are closely related to those causing sand lines. Measures taken to avoid either one will decrease the occurrence of the other.

Sand Scabs—This is the name given to deposits of excess metal that have penetrated beneath thin layers of sand which have thus been lifted from the mold surface (Fig. 7). Such scabs are usually separated from the main body of the casting. Sand lifting can be avoided by refraining from patching molds, a practice which should be severely frowned upon. Weak sand, high moisture content and hard ramming are other likely sources of this kind of trouble. Occasionally the same causes are involved that bring about sand lines and sand (*Please turn to page* 259

How Temperature and Pouring Rate Affect

SOLIDIFICATION OF BRONZE

By HAROLD J. ROAST
Bronze Foundry Consultant
Ottawa, Canada

IN EXAMINING the relation between temperature, rate of pouring and solidification of bronze, let us consider a solid cylinder cast in a dry sand mold and having a 6-in. OD and 15-in. height; also a bushing produced by inserting a 3-in.-diam core into such a mold to leave a wall thickness of 1½ in. Assume the composition is 88 per cent Cu, 8 per cent Sn, 4 per cent Zn, and the metal is poured directly into the mold from the top.

Here's What Happens—If the metal is poured at a temperature 100° F above its melting point, and if the mold is filled as rapidly as possible, the following developments take place. In the case of the solid cylinder the metal starts to solidify from the bottom and sides. While the temperature is high, any metal required to make up for the shrinkage in volume due to solidification is readily provided. However, as the molten metal cools it is decreasing in fluidity; furthermore, an ever increasing number of dendritic crystals is growing within the metal.

These crystals form a network which still further hampers the flow of the remaining molten metal needed to fill in the interstices between the crystals. The result is that there is an area of metal having small voids or porosity around the central area of the cylinder, as well as a shrink at the top.

It has been suggested that increasing the height of the cylinder by means of a riser, either of the same diameter as the cylinder or larger, will give a solid casting. In the case under consideration this cannot be depended upon, because metal will not feed down completely when such a ratio exists between diameter and height. The riser will eliminate the top shrinkage, but disks cut from the central portion of such a cylinder will leak under pressure.

Slow the Pouring Rate—This latter trouble can be avoided by slowing down the rate of pour and reducing the temperature. Care is needed in making this adjustment, else cold shuts or misruns will occur. The object is to so feed in the metal to the mold that it will solidify completely and progressively as the mold is filled.

If we pour the bushing in the same manner, it too will have a porous area about midway, and this trouble also can be eliminated by the right relationship of pouring rate to temperature. This principle is used in the case of the Holfos bushings cast in England where the bushing is made by the withdrawal of the solid metal core just ahead of the solidifying metal.

Pick the Right Cause—Emphasis is laid on the importance of the right relationship between pouring rate and temperature because it is the writer's experience that, frequently, the cause of porosity under the circumstances described is laid to gassy metal, or the risers not being large enough, or the sand being too wet, or the metal too cool, whereas the real trouble has been that the metal was poured at too high a temperature or at too high a speed, or both.

It is obvious that this principle is often involved in castings other than straight sticks or bushings, and by applying the principles enunciated good results may be obtained. Other factors must, of course, be correct also.

Casting Horizontally One Answer—Another and simpler way to handle such cylinders and bushings is to cast them horizontally instead of vertically, with an extension and riser to enable the stick or bushing to be easily removed. Notwithstanding this alternative, however, it is still worthwhile to bear in mind the principle of rate and temperature of pouring as important adjuncts to successful casting.

In centrifugal casting with permanent molds this principle is particularly useful and by studying it carefully, much trouble may be avoided. The method of getting the metal into the mold as fast as possible and as hot as possible frequently results in failure.

Alloys of short freezing range—such as zinc 10 copper 90, aluminum bronze, true phosphor bronze or pure copper—are easier to handle than the tin or tin-lead bronzes; the latter give more trouble in solidification and therefore demand careful attention to the rate-temperature pouring principle.

When considering the raising of the pouring temperature it should be remembered that the enlarging of the minimum cross section of the casting may make higher temperature unnecessary by giving freer entry of the metal into the mold. Also, a difference of 25° F may mean the difference between success and failure.

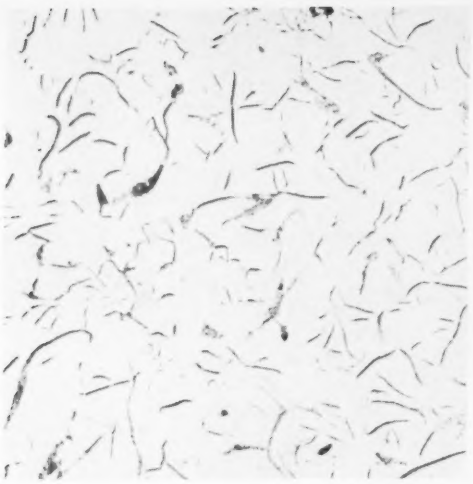


Fig. 1—Unetched gray iron showing distribution of gray iron flakes

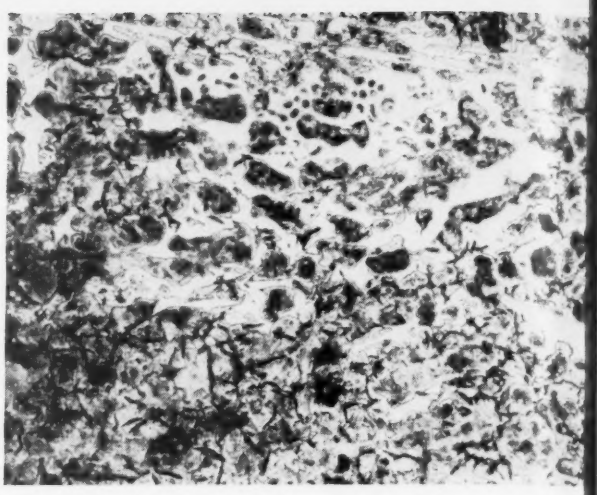


Fig. 2—Crystals of massive cementite intermixed with pearlite and graphite

Annealing or Softening

Improves Gray Iron Machinability

This is the first of two articles representing a section of a manual, "Heat Treatment of Gray Cast Iron," being prepared by the Gray Iron Founders' Society. It discusses annealing to improve machinability

ANNEALING or softening involves heating a gray iron casting to a temperature sufficiently high to alter its structure. This form of heat treatment is generally used when it is desired to improve the machinability of a casting.

Because annealing, unlike the stress relief process described in FOUNDRY, August and September, 1953, brings about basic changes in the structure of the gray iron, the resultant improved machinability is usually accompanied by some decrease in strength and hardness. An incidental, though frequently very desirable, result of annealing is the concurrent relief of internal stresses in the casting.

Adequate attention has not been given this process, since gray iron, even without annealing, is more machinable than most other ferrous materials. Furthermore, the exact metal placement made possible by the casting process minimizes, and sometimes eliminates, the necessity for any machining operations. Nevertheless, as a rule even a cast product usually needs a certain amount of machining, and since modern production methods often require high-speed automatic machine tools and very high cutting speeds, maximum machinability is a very important consideration. If the resultant loss in strength and hardness can be tolerated, annealing should be and is being increasingly employed in such cases.

Despite the fact that much work remains to be done concerning many important points of theory and procedure, the basic facts about annealing gray iron are known, and it is, with the possible exception of stress relief, the type of heat treatment most frequently applied to gray iron. It is the purpose of this article to indicate the nature of the process, to describe its advantages and limitations, and to give, as far as possible, specific recommendations for procedure. A few of the present and potential applications of annealed gray iron will be pointed out. It is hoped that the distribution of such information will stimulate wider and more intelligent use of annealing as applied to gray iron.

Mechanism of Annealing—Annealing is of particular effectiveness in the case of gray iron because of the physical presence of flakes of graphite (free carbon) in its structure. Gray iron has such flakes because it contains larger percentages of carbon than other ferrous materials.

This large percentage of carbon is normally present in two different forms. First, there is, as just noted, always a certain amount of graphite in the form of

By CHARLES O. BURGESS
Technical Director
Gray Iron Founders' Society
Cleveland

Fig. 3A—White iron, unetched, showing the absence of graphite flakes

Fig. 3B—This etched micrograph of white iron shows pearlite, cementite

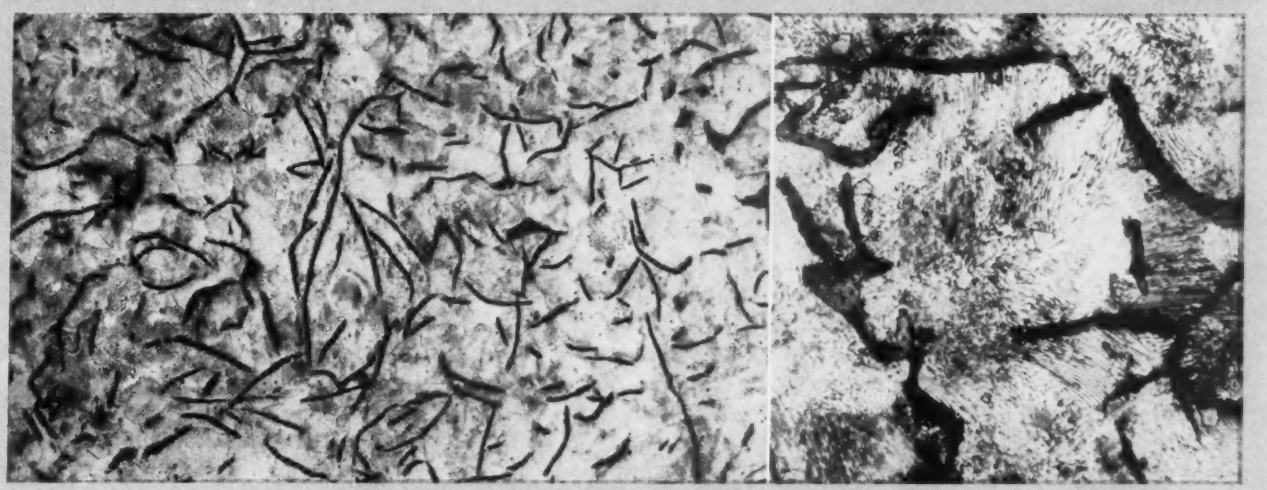


Fig. 4A—High-strength gray iron containing pearlite and graphite. X100

Fig. 4B—High-strength iron at X750 shows pearlite lamellar structure

Fig. 5—Annealed gray iron consists of machinable ferrite and graphite

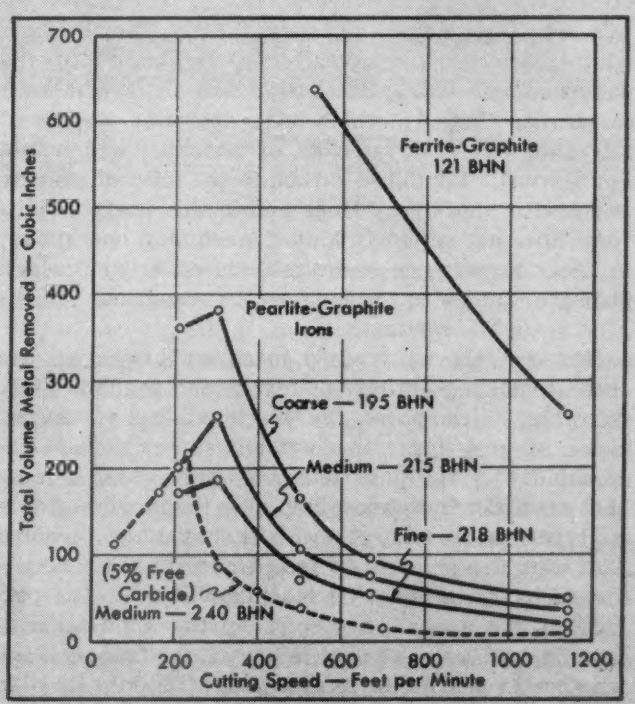


Fig. 6—Amount of metal removed at various cutting speeds before a given amount of wear on the cutting tool. Data are shown for five gray irons of different microstructure and hardness

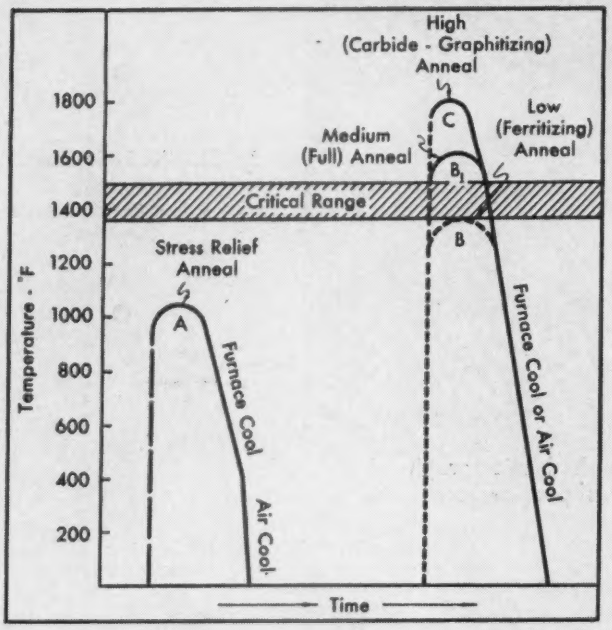


Fig. 7—Recommended annealing cycles (Curves B, B_1, C) compared with stress-relief cycle

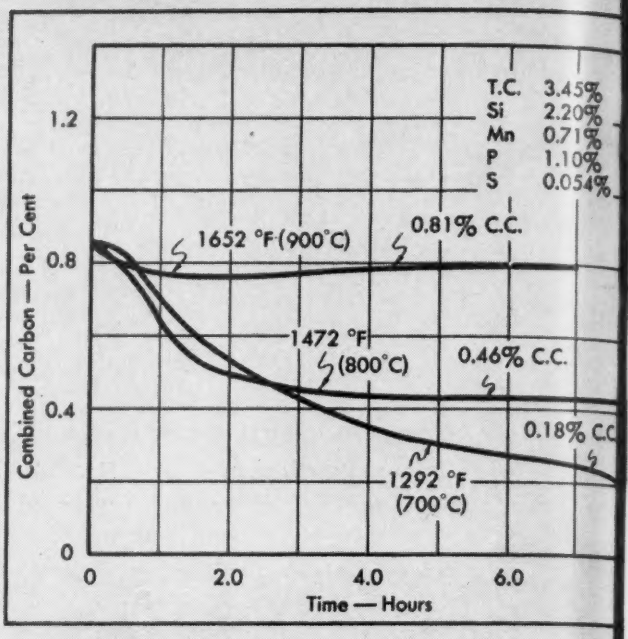


Fig. 8—Showing effect of three different annealing temperatures on combined carbon content

flakes (Fig. 1), giving to gray iron some of its most advantageous characteristics, including the superior machinability already mentioned. Second, unless annealed, gray iron also contains a certain amount of carbon in a combined form as cementite (Fe_3C) which in turn is found in two forms:

(a) It may be present as massive, hard crystals of cementite which in mottled iron (Fig. 2) exist as isolated crystals imbedded in the matrix, and in chilled or white iron (Fig. 3) constitute a major part of the structure. These combined carbon or cementite crystals are very hard and, consequently, mottled and white irons are very difficult to machine; (b) the combined carbon may also be present as a constituent in pearlite (Fig. 4), which latter material consists of alternate layers, or lamellae, of cementite and ferrite (pure iron). Combined carbon in the form of pearlite is found in most gray irons and in this finely divided form does not seriously hinder machining operations; in fact, its presence is desirable in cases where high strength and wear resistance are important to the service of the casting.

However, the most easily machined gray irons are those consisting entirely of ferrite and graphite (Fig. 5). Fig. 6 compares the machinability of several types of gray iron; the striking superiority in machinability of the pure ferrite-graphite iron, such as that resulting from annealing, over the pearlite-graphite types can be seen at once. It should also be noted that even five per cent of free cementite has a noticeable deleterious effect on machinability[1]. The purpose of the annealing process by the application of heat is to break down or separate the iron carbide, whether as pearlite or as free cementite, into its component elements of ferrite and graphite.

Such decomposition of pearlite into the highly machinable ferrite-graphite combination, it is interesting to note, is not possible in the case of steel. The pearlite in steel may be transformed by annealing into the somewhat more machinable spheroidal form, but the most desirable combination, that of ferrite and graphite, can only be obtained in gray iron, where the existing graphite flakes serve as centers for the deposition of free carbon during annealing.

Recommended Annealing Temperatures and Times—The annealing process is directly dependent on temperature. It has been estimated that, given infinite time, some decomposition of pearlite will occur at temperatures as low as 750° F[2]. However, up to approximately 1150° F, the effect on structure is insignificant in the case of normal gray iron[3]. As the temperature increases above that point, the rate of pearlitic decomposition to ferrite-plus-graphite increases sharply, reaching a maximum at the critical point, i.e. in the neighborhood of 1400° F, for unalloyed or low-alloy gray irons[4].

Three different temperature ranges, as shown in Fig. 7, are commonly used in annealing gray iron. These are the low-temperature anneal, (curve B), the medium anneal (curve B_1), and the high-temperature anneal for the elimination of massive free cementite (curve C). For comparison, curve A shows that the usual heat treatment for stress relief, described in the previous article is considerably lower than those used for annealing[5].

Low-temperature Anneal—(Curve B in Fig. 7)—In the case of an unalloyed or low-alloy cast iron of normal composition, where the only result desired is the conversion of pearlite to ferrite and graphite for improved machinability, it is generally unnecessary to

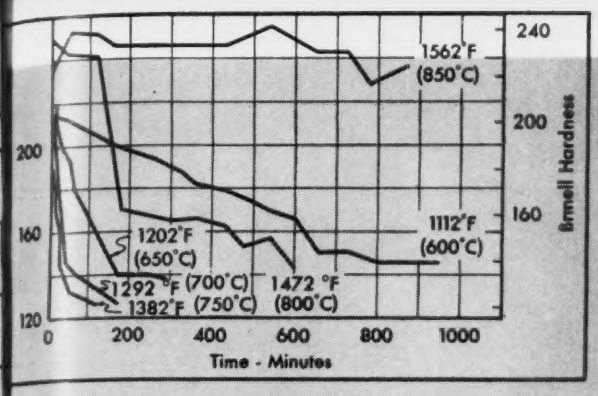


Fig. 9—Effect of annealing temperature and holding time on gray iron containing 3.38% TC, 1.93% Si, 0.72% Mn, 0.10% P. Specimens were air-cooled from annealing temperatures

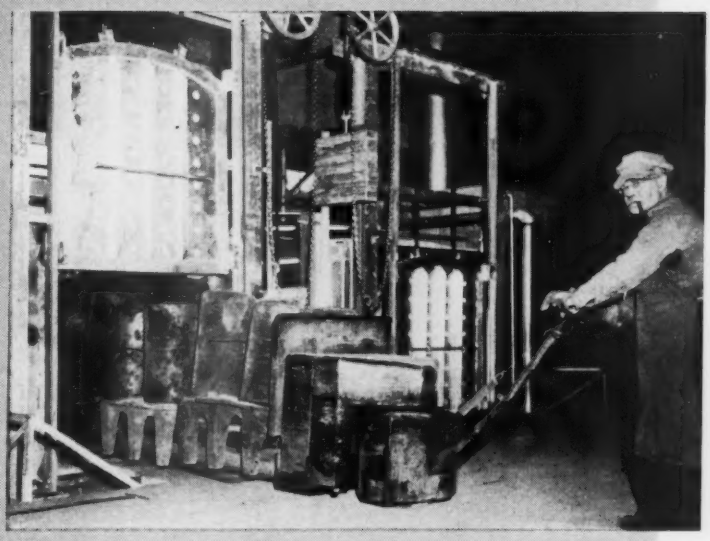


Fig. 10—Castings packed in sealed containers being loaded into an annealing furnace

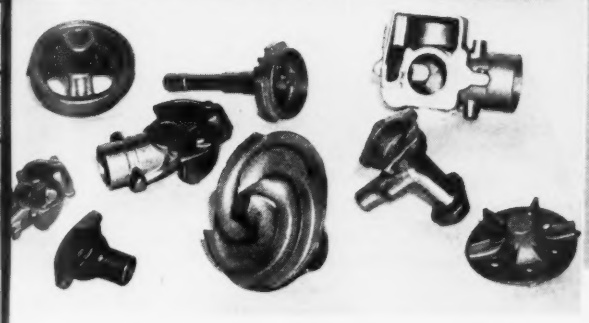


Fig. 11—This is type of gray iron castings annealed in furnace illustrated in Fig. 10

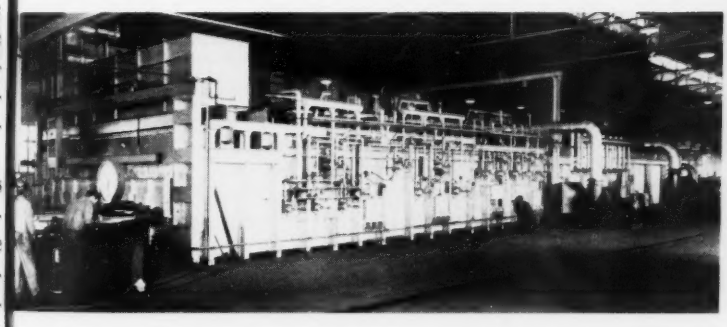


Fig. 12—Modern gas-fired furnace employed to anneal centrifugally cast gray iron pipe

Fig. 13—Electrically heated annealing furnace has controlled atmosphere

heat the casting to a temperature above the critical. (As an approximation, the critical point can be estimated as follows: In a pure iron-carbon alloy, the critical point is at 1346° F. This temperature is raised by about 50° for each per cent of silicon content, but is lowered by about 45° for each per cent of manganese present. This can be expressed by an equation: Critical temperature = 1346° F + 50° (% Si) −45° (% Mn). Thus a gray iron containing 2.0% silicon and 0.70% manganese would have a critical temperature of 1415° F[2], [17].) In fact, heating to higher temperatures may even be detrimental to the annealing process, since the graphite will begin to go into solution in the iron[4].

The detrimental effect of a super critical temperature in the case of one gray iron is shown in Fig. 8. (It will be noted that this sample gray iron is unusually high in phosphorus content, but it has been found to respond to annealing in substantially the same manner as lower-phosphorus irons.) It can be seen that there was substantially no reduction in combined carbon content in the case of the sample treated at 1652° F, whereas the combined carbon content was cut approximately in half at both 1472° F and 1292° F after 2½ hours. Since 1472° is about 50° F above the critical point of this iron an equilbrium level of 0.46 per cent combined carbon is reached, while at 1292° F it is obvious that with sufficient time the combined carbon will drop to zero. Actually for the most rapid annealing a temperature of about 1400° F should have been employed. The advantage of this same subcritical anneal for minimum (*Please turn to page* 250)

Men who direct the foundry unit include, left to right: Sgt. William H. Martin, Lt. Robin R. Forsberg, Capt. Charles S. Grazier, Lt. Charles Buck, John H. Williams, SFC James D. Farmer, and Sgt. George L. Nol...

Army Engineer

RECOGNIZING the importance of producing castings in the field to furnish parts for repairs and maintenance of military equipment, Army Engineers have developed a mobile foundry unit and are training personnel in the operation of a foundry. Recently the author spent an interesting morning at Ft. Belvoir, Va., inspecting the original foundry unit, which is used to produce castings at the fort for repair and maintenance. It is here that men, many with no previous experience in making castings, are trained in foundry work.

The unit at Ft. Belvoir is the 529th Engineer Company (Service) Foundry and is a part of the 49th Engineers Company (Depot Maintenance). At full strength the company consists of 18 men who perform all normal foundry operations from making the patterns to cleaning the castings. Equipment for this mobile foundry includes flasks, a core oven, an induction furnace of 210 lb capacity, control panel, two diesel-driven generators and the necessary supplies. All equipment is portable and may be placed on trucks for movement in the field. The control panel and diesel-electric units are equipped with large eyes so that they may be picked up and moved with ease by a mobile crane.

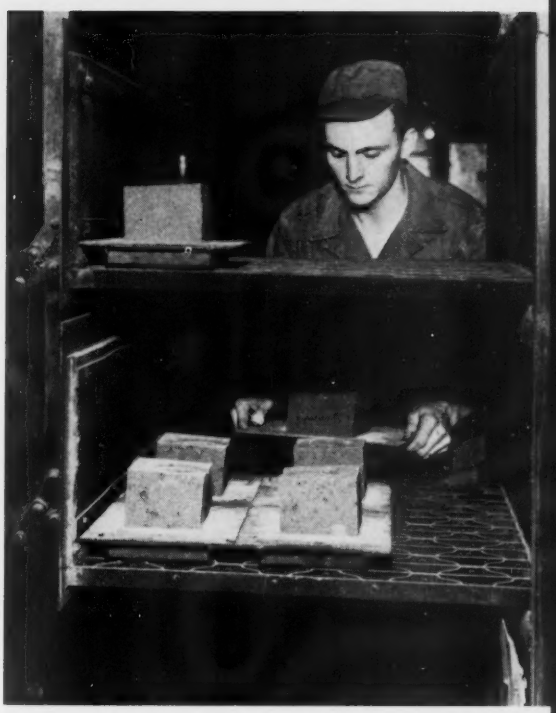
The work required from the foundry presents a continuous challenge to the personnel. Patterns frequently are not available and the damaged part must be used as a pattern. In some instances the old part is not complete, and it must be patched with various materials, such as linoleum, before it can serve as a pattern. The problem of adding sufficient metal for machining frequently is present. Improvising is the usual course of operation, rather than the exception.

But the greatest challenge arises from the fact that 90 per cent of the personnel never saw a foundry before being transferred to the company. When the company needs men, an effort is made to find trained men in the engineers corps. If experienced personnel cannot be found, a call is issued for those interested in taking the training. The young fellows seen at the fort seem to like the work and show considerable aptitude in the training program. Some of those trained in the outfit, who have since completed their enlistment, are working in foundries in various parts of the country.

One mobile unit now is in operation in Germany. The nucleus of that company was trained in the foundry at Ft. Belvoir. Other mobile units could be put into the field if required. Army engineers point out that matter of parts supply in the field is tremendous, and frequently a mobile foundry can get the necessary part to put equipment back in operation in a matter of hours, whereas days would be needed

PFC Lawrence Stratton, a pattern-[illegible]er, prepares pattern for molders

Pvt. Glenn Rostad (foreground) and Corp. Dale Wagner working on a mold



PFC Robert L. Goetz, a coremaker, inserts green sand cores into oven

perate Mobile Foundry

By FRANK G. STEINEBACH
Editor

to process the part by other means.

Both officers and enlisted men at the fort seem quite enthusiastic about the work they are doing in the foundry. Capt. Charles S. Grazier is company commander and 1st Lt. Charles T. Buck is executive officer of the 49th Engi- (*Please turn to page* 175)

CWO M. O. McElwain, officer-in-charge, Corp. E. Z. Fairchild and J. H. Williams

Civilian Supervisor Williams and PFC Huey Burchett pour a mold, assisted by Corp. Fairchild, furnace operator

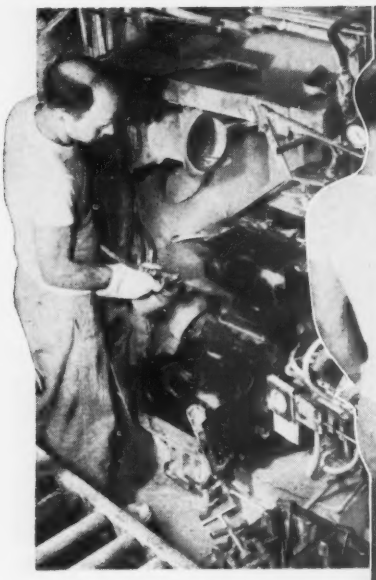


Fig. 1 — Parting agent is sprayed on corebox halves

Fig. 2 — Heated chills are placed in corebox cavities

Fig. 3—A measured quantity of sand mixture is dropped into the corebox

Fig. 4 — After curing, r box dumps surplus center

By JOHN L. SCHMIEDER
Research Engineer
Oberdorfer Foundries Inc.
Syracuse, N. Y.

Use of Shell Cores —*In Castin*

WHILE shell molding today is being used in the production of a wide variety of castings in both ferrous and nonferrous metals, it should not be looked upon as a universal mold making method nor as a cure-all for foundry problems. However, its many unique advantages justify its consideration for numerous applications.

When details of the shell molding process first became known in this country after World War II, Oberdorfer Foundries Inc. immediately turned available data over to its research laboratories for experimental use and further development, particularly for the production of cores for nonferrous castings.

An interesting application of the process is in making the core used in casting an aluminum, air-cooled engine cylinder head. This core forms the internal combustion chamber and two ducts for intake and exhaust ports. The machinery for making the shell cores, shown in the accompanying illustrations, was designed and rigged by Oberdorfer. It consists of a dump type corebox with a rollover device. An aluminum corebox was used on initial runs, but this is being replaced with a cast-iron box in anticipation of longer runs because the latter is expected to last longer and develop less carbon build-up.

The corebox consists of two female halves which are hinged for opening. An iron platen with cast-in heating elements is inserted in the corebox. This heats the entire box and patterns, maintaining a temperature of 570° F. An air cylinder actuates the closing and opening of the box. The working area around the corebox machine is enclosed by a booth with a suction pipe to draw off flying sand, dust, fumes and heat.

The process commences with the box open. The surfaces of both corebox halves are coated with a silicone emulsion parting agent consisting of 15 parts water to one part silicone proprietary release agent. The box is closed, and four cast-iron chills are inserted into the cavity to form the dome of the combustion chamber. The chills are first preheated to 550° F in an adjacent gas oven. These chills are grooved t

Fig. 5—Radiant heating unit cures inside of shell. Supplemental feed pipe is at the right

Fig. 6—When the corebox is taken out and opened, the finished hollow core separates cleanly from it

tin Air-Cooled Engines

permit venting of gases, to strengthen the mold, and to save some mix. A funnel is temporarily positioned in the corebox opening.

Above the corebox is a hopper containing 1000 lb of fine silica sand mixture. To a blend consisting of 80 per cent AFS-90 fineness and 20 per cent AFS-180 sand, 6 per cent phenol-formaldehyde resin is added. A small amount of kerosene is also introduced as a dust suppressor. This free-flowing mix is previously made up in 100-lb batches in a concrete mixer. A commercial dough mixing machine or other type of muller could be used. The mix is thoroughly blended to surround every particle of sand with the resin.

A sufficient quantity of the mix is dropped into a measuring container and then into the corebox itself, where it fills the pattern cavity. Simultaneously the sand mix is blown through two pipes into openings on each side of the corebox to supplement the sand at the ends of the exhaust and intake ports. These supplementary feed pipes are swung into position against the sides of the box just long enough to deliver the sand to the corebox cavity and are immediately removed. While in position they are sealed against the box by means of silicone rubber gaskets to prevent air leakage.

Fig. 7—Cutaway half of a typical cylinder head reveals the interior wall of the exhaust and intake channels and shows the fine formation of the combustion chamber

The corebox immediately begins to melt the resin plastic, binding the sand to a depth of ¼-in. The longer the mix is left in the box, the thicker the mold becomes, up to a maximum of about ¾-in. The minimum practical thickness of a shell mold is about ¼-in. although Oberdorfer has experimentally made successful molds for light aluminum castings of 3/16-in. thickness.

The box is then rolled over, allowing the uncured loose center portion of the core to drop out, leaving only the crusty shell in the box. The dumped mixture, which represents a material saving, is later returned to the hopper for reuse.

A radiant electric heating element is then held inside the core for a short time to cure the inner side of the resin sand. No later curing of the core in an oven is necessary. The box is then opened, the shell core is easily stripped from the corebox, and the operator is ready to repeat the cycle.

The resin-sand mix produces a porous mold that permits ready emission of gases during casting and prevents blows which might cause pitting. Radiographic inspection shows castings to be free from objectional shrinkage or other internal defects. No sprayed mold facing is used since this was found to have no practical advantage in improving the casting surface. The entire cycle described above is faster and simpler than description would indicate. The operator averages 40 cores per hour. Each core when completed contains 2 lb, 10 oz of sand mixture as contrasted with a conventional core weighing 7 lb, 9 oz. The over-all foundry cost saving by the shell method on each cylinder head core is 6 cents.

Another good example of a casting problem that could be satisfactorily solved in no other way than by shell molding is the case of an oil line which had to be cast into the entire length of an aluminum crankcase for a six-cylinder engine. Originally the oil line was provided for by casting a permanent steel tube in the crankcase. Tributary feed lines were later drilled into the main line. When these pierced the tube, steel chips backed up into unavoidable blow pits between the sleeve and the aluminum block itself. Vibration later jarred the chips back into the line, ruining the cylinder walls and piston rings.

The problem was solved by eliminating the steel tube entirely and casting the oil line in the aluminum block itself by means of a long slender shell-molded core which could be cleanly knocked out to leave the necessary smooth walls in the line. The way this

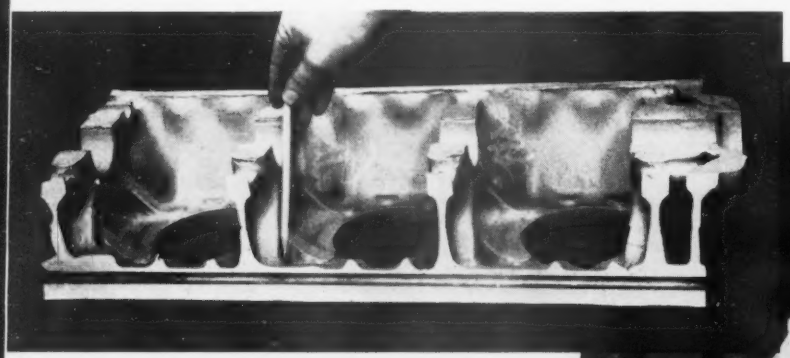


Fig. 8—A cutaway section of the crankcase exposes horizontal oil line, near the base, formed by the hollow shell-molded core illustrated in Fig. 13. Pencil indicates the direction of tributary bleed lines, which have to be drilled through the case, into the main oil line

Fig. 9 — In this illustration, concave half-patterns for oil core line are being sprayed with parting agent

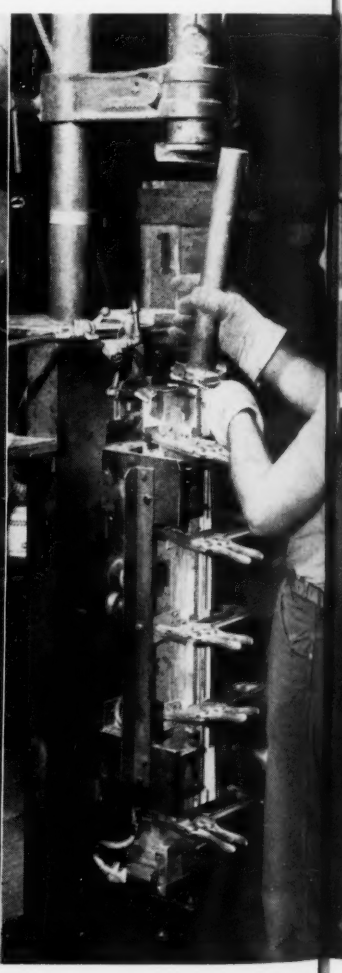


Fig. 10—Clamped corebox is rotated and sand mix cartridge is placed between box opening and blow machine

core is made is worth a brief description.

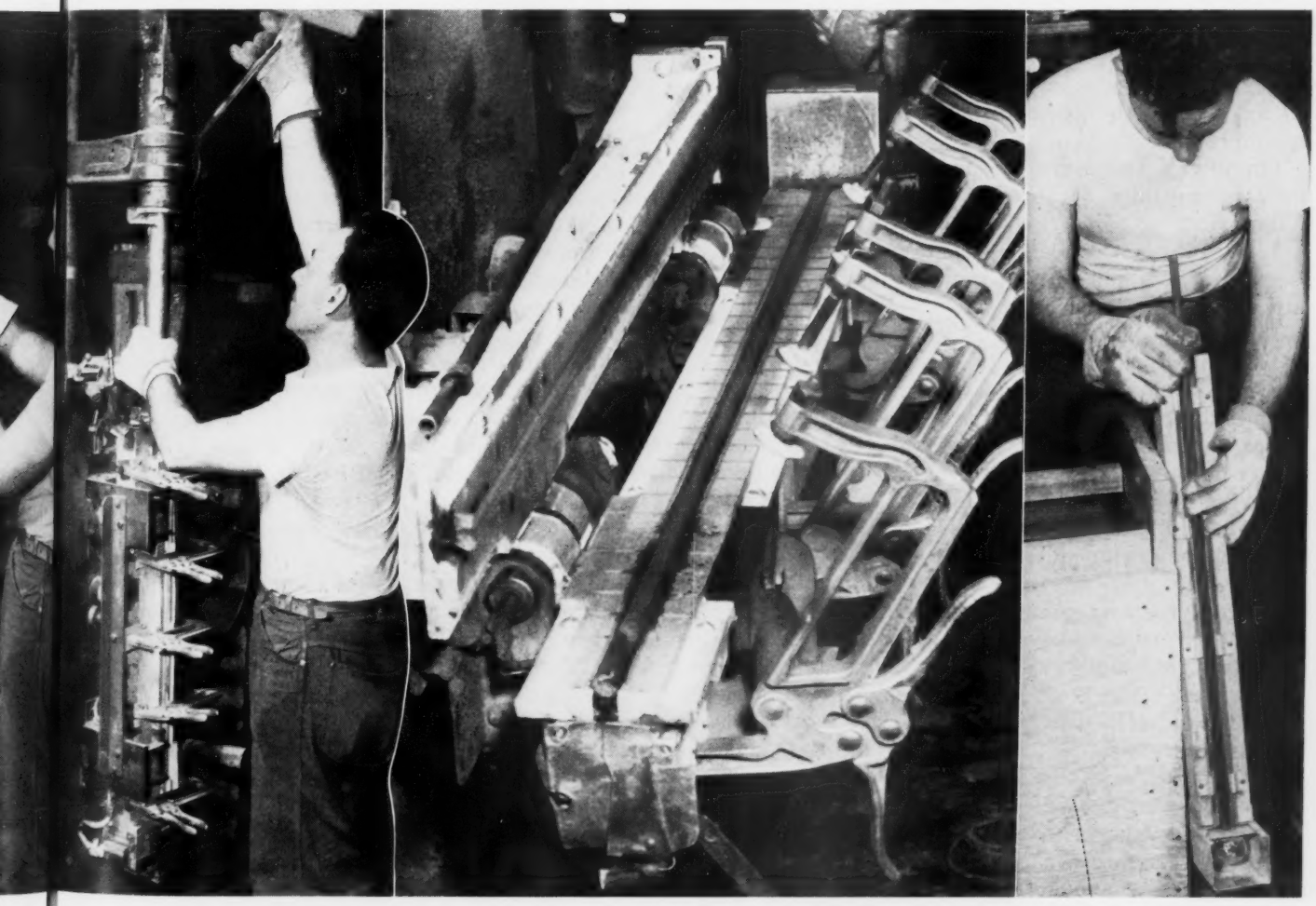
A long horizontal aluminum corebox opens to reveal two semi-cylindrical half patterns for the core. The box is heated to 550° F by thermostatically controlled electric elements. Both corebox halves are then sprayed with a silicone emulsion parting agent. The box is clamped shut and rotated to a vertical position. A blow head cartridge containing a resin-coated sand mix is placed between the corebox aperture and a cartridge type blow machine, which forces the mix into the box under 120-lb pressure.

The box is then rotated back to a horizontal position and the mix allowed to cure for a few moments. Slight fins are quickly scraped off. The fine glazed surface of this core produces a smooth uniform oil line. In spite of their close texture, the porosity of shell cores permits easy escape of gases with consequent elimination of blows.

Generally speaking, shell molding is an economical and highly satisfactory technique for a number of casting applications in aluminum alloys, tin and gun metal bronze, gray, malleable and ductile irons—capable of producing excellent surface finishes with tolerances of .005 to .010-in. per in. Because shell mold patterns must be heated, it is necessary to calculate expansion and allow for it in the pattern. The process requires a complete departmental setup of its own. Because foundry help must learn new ways from start to finish, it is generally desirable to employ people without previous foundry experience for production jobs.

Shell molded castings cannot be thrown around or roughly handled like ordinary castings because the customer often uses them as they come, and the smooth surfaces and sharp corners must be protected. Knock-out and cleaning is faster but more critical. Patterns must be designed and made differently, and the mold making procedure itself must follow a different set of rules from other methods. The entire department should be carefully planned and integrated along new lines.

In the event of war, shell molding would probably prove to be a highly important factor in the production of ordnance, not only because of its many commercial advantages, but because of its saving of vital materials, its use of less skilled help, and the light weight of the molds which permits the use of women operators. Where applicable, the process is capable of producing more molds per hour than any other method known today. Undoubtedly, continued technical development will further expand its advantages and application possibilities.



Figs. 11, 12 and 13 (on the left, in the center and on the right, respectively) reveal further, successive steps in the operation. In Fig. 11, sand mix is blown into the pattern cavity. Fig. 12 shows how the corebox is swung to the horizontal and opened, and in Fig. 13 the core is examined by lighting from beneath

foremen's problems *and How to Solve Them*

AN EXECUTIVE who has studied grievance machinery in many organized plants compared the procedure applying to production workers to a late model Cadillac. "What is done about foremen's grievances, however," he said, "is a 1920 Maxwell."

He pointed to the fact that foremen's gripes seem to get nowhere. They tend to be repetitive, carrying over from year to year without anything being done about them. Although this may be overstating the case somewhat, there is no doubt that management's attention can be profitably devoted to the problem. The foreman group is too valuable and vitally important an element of management to allow it to become corroded through dissatisfaction or dulled through misinformation.

Classifying Foremen's Grievances—The most frequent complaints of foremen may be grouped as follows:

1. *Long Term:* Complaints which stem from accumulative practices and where correction may take a relatively long time. Under this heading would be items such as wage differentials, lack of prerogatives, little chance for promotion.

2. *Day-to-Day:* Complaints whose sources are conflicts in normal operations, problems with maintenance, communications, etc., can usually be found rather quickly. Corrective action, however, may take some time.

3. *Personal:* Difficulties because of personality factors, relations with other departments, and reactions to superiors.

Much of the management criticism leveled at some foremen is justified. By and large, however, observers agree that industry's foremen represent a loyal, diligent force who react most favorably to consideration and understanding. It is in the interests of increased understanding that the following sample grievances are exhibited.

The following quotations have been picked from recent opinion surveys; they are typical of a large percentage of foremen's gripes.

Long-Term Grievances of Foremen:

Incomprehensible Promotion Policy—Foremen say:

". . . . I've been in this job 23 years. But whenever a better job has to be filled, an outsider gets it."

"If you're not a relative you haven't got a chance for promotion. . ."

Approach: In the majority of cases, misinformation or no information generates misconceptions. Does your company have a logical, fair promotion ladder for foremen? Have the foremen been told about it lately? Do promotions from foremen ranks in the past five years bear out this policy?

Solution and Prevention: Critically review present policy and make necessary changes to make it currently equitable. Problem cases, which may be used as referral points ("Look at old Joe. . ."), may be dealt with on an individual basis. Keep foremen informed.

No Voice in Union Contract Negotiations—Foremen say:

"You've got to be a lawyer to get people to understand those clauses about reporting pay, lay-outs and standbys. Cause me an awful lot of trouble. They ought to be plain and simple. . ."

"Second time around. We had meetings six months ago asking for our ideas about changes in the contract. Rehashing same old stuff. They paid no attention the last time and they won't now. . ."

Approach: Gage the depth and width of difficulties created by operational clauses in contract. Foremen should understand the intent and application of every clause. Troublesome clauses may be wrong—the foremen may be right. A feeling of participation is developed if foremen's reactions are invited. Some foremen's prejudices form blocks to proper imple-

By ARTHUR C. CROFT
President
National Foremen's Institute
New London, Conn.

mentation of the operational clauses.

Solution and Prevention: If meetings are held, someone capable of explaining technical points should be in charge. If suggestions are accepted from foremen, disposition of their ideas should be reported back to them. During negotiations, foremen should be kept informed before anyone else. After the contract is signed, they should be briefed on changes.

The Time Lag in Wage Increases—Foremen say:

"The company said it was wrong to tie our salaries to union negotiations, so we didn't get a raise the last

two times wages were increased. Doesn't seem right, somehow. . ."

"Merit increases are a laugh. I haven't had a raise in five years, and the department is almost twice as big as it was then. . ."

"We're expected to work overtime, Saturdays and Sundays, if necessary. But do we see any extra money?"

Approach: The pressures of rising wages of production workers, and living costs, have caught some foremen in a squeeze. Merit increase procedures might be reviewed, not only in relation to former years, but in relation to the hourly rate curve. The maintenance of a 15 or 20 per cent differential is important as a factor in foreman leadership and department morale. Merit increases, important to all foremen, are particularly vital to men recently promoted from former positions as operators.

Solution and Prevention: Inform foremen of your policy and the reasons for it. Keep them informed on changes and why they are made. Inform them individually of their exact status. Review foremen salaries at stated intervals.

Budgets and Quotas are Meaningless—The most frequently heard grievances arise when foremen who are asked to submit budgets and quotas find that their recommendations are ignored; or when foremen receive arbitrary figures without prior consultation.

"Each year it's more and more production, less and less to spend. . ."

"Why do they go through the motions of asking *me*? They make up their own minds anyhow. . ."

Approach: Personal horizons are frequently limited to one's own department. Over-all company problems and goals should be interpreted so that each foreman understands his contribution to the whole.

Solution and Prevention: Whether estimates are requested or not, foremen should be given some justification for the figures set for their department. Praise or prizes given solely on percentage of quotas should be supplemented by recognition of good performance based on handicaps encountered or bad breaks overcome. A personal understanding between departments involved should pay dividends. Through communications, foremen should never be permitted to lose sight of the over-all company position.

Day-to-Day Grievances of Foremen:

"That (#)&%!!&()#$%& Maintenance Department!"—One of the sorest spots on foremen is the chafed areas where they come in contact with maintenance. Perhaps friction is caused by their dependence upon that department and their lack of control over it. Pressure for production on foremen is constant and any interruption is resented. If the interruptions cannot be blamed on maintenance, at least the time taken to make repairs can be held against them.

Too many maintenance departments, being in a state of perpetual siege by foremen, assume a defensive attitude. Being under constant pressure, they are in no mood to win (*Please turn to page* 227)

statistical quality control

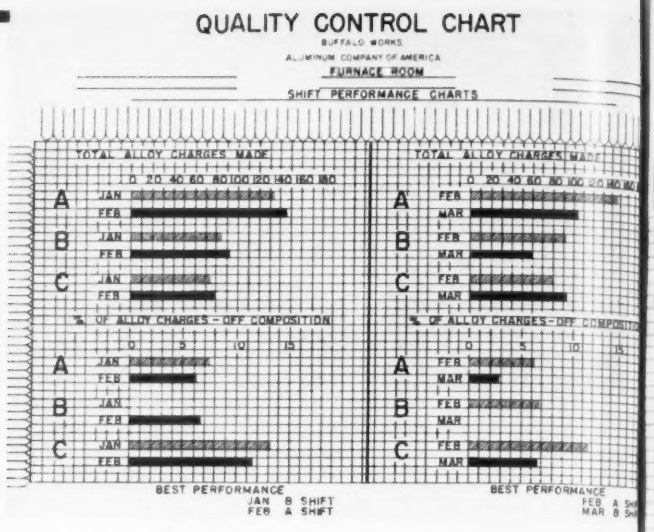


Fig. 1—"Shift Performance Charts" show per cent of off-composition melts occurring on each shift

Although this article covers application of statistical quality control to a magnesium sand foundry, the principles and benefits also can apply to other types of foundries

STATISTICAL quality control is applied in a foundry much the same as in any other industry, except for one fundamental difference—its method of application.

In many types of manufacturing processes, the machine is the one greatest variable. In a foundry, however, so much depends on the worker's ability, attitude and know-how, that he is the paramount varying factor. A machine turns out parts in rapid succession. An inspector can readily sample from this production universe, make a few measurements, plot a point on an $\overline{X}$ and R chart, p chart or use another statistical tool. With these he can make a decision as to what course he should follow in adjusting the production robot.

This situation does not yet prevail in a sand foundry. Perhaps some day such a founding technique will be developed, but for the present, castings must be made utilizing to a great extent the craftsmanship of men. In addition, a jobbing foundry has an added problem in the lack of common data that are available in mechanized industries.

For these reasons, some people believe that modern statistical quality control tools and principles cannot be applied in a sand foundry. This article refutes this by presenting the successful use of quality control in the production of magnesium castings at the Buffalo Works of Aluminum Co. of America.

Alcoa's Buffalo Works has made application of acceptance sampling, $\overline{X}$ and R charts, p charts, regression and correlation techniques and analysis of variance. In addition, Alcoa expects to conduct further development work along the lines of statistical design of experiments.

It may be a little premature to expound on the accomplishments at Buffalo with these new ideas, since they have been used for only nine months. However, the results during this short period have been excellent.

In the foundry, one has to deal more with the individual. For this reason, it is necessary to apply statistics spiced with some psychology in an effort to attain the common goal of all quality control, that of reducing scrap and rework.

It is well known that the average man has within him a desire to do better than his co-workers. At Buffalo it was felt that this desire could be stimulated by indicating to a man how he compared with his fellow worker. The incentive to do a better job naturally results in better control of quality.

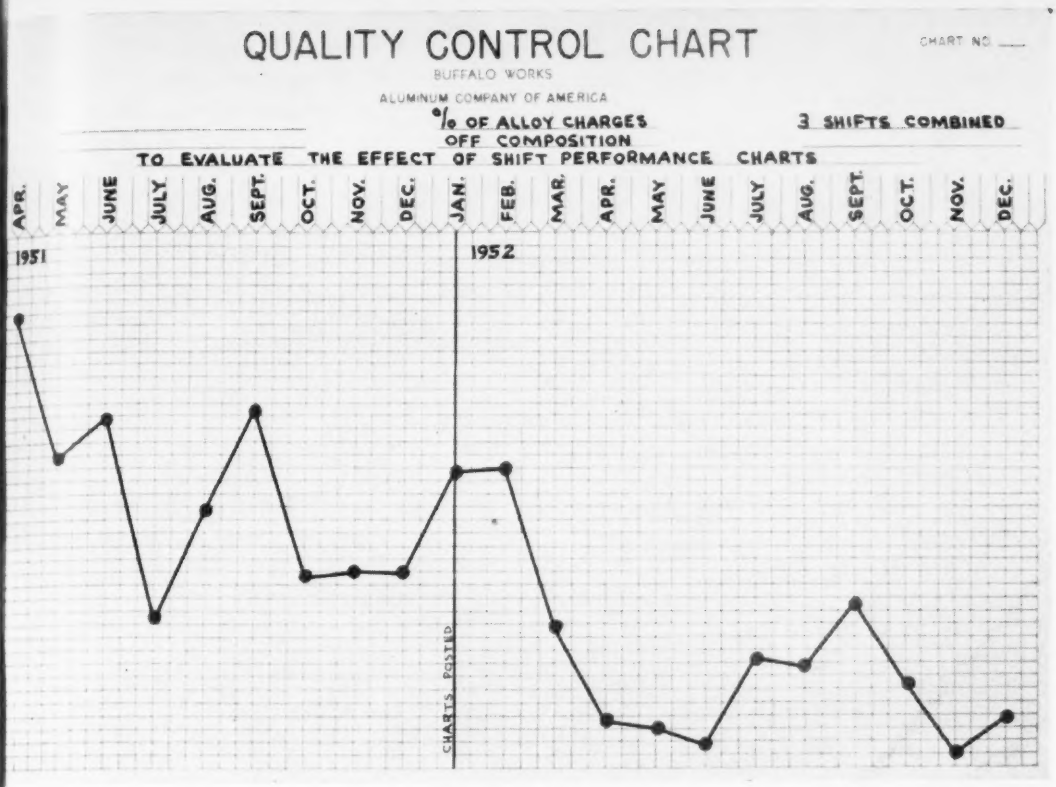
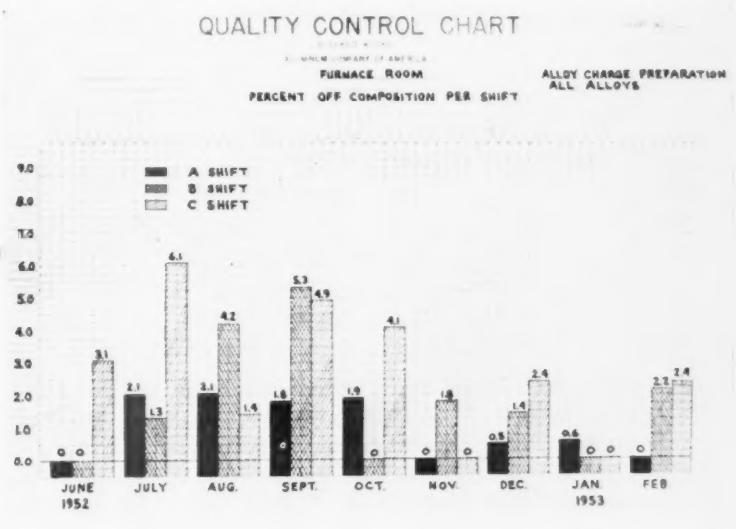

QUALITY CONTROL CHART
CHART NO.
BUFFALO WORKS
ALUMINUM COMPANY OF AMERICA
% OF ALLOY CHARGES OFF COMPOSITION
3 SHIFTS COMBINED
TO EVALUATE THE EFFECT OF SHIFT PERFORMANCE CHARTS
APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1952
CHARTS POSTED

Fig. 2—Monthly trend of the off-composition melts for three shifts

Fig. 3—Percentage of off-composition melts broken down by shifts

By A. J. KUKLA
Chemical Laboratory Supervisor
Buffalo Works, Aluminum Co. of America
Buffalo



Take, for example, the molder of the past, or one who may still be found in some scattered foundries. He had to be able to ram the mold, set the cores, pour his own metal, shake out his own flasks and so forth. In this way, he was familiar with, and responsible for, all operations. He saw the results of his efforts immediately, good or bad, and could hardly avoid having a self satisfaction about the completed job.

Today in most production sand foundries, most of the varied operations are carried out by different men. This breakdown has no doubt increased production, but it has also caused a loss of quality which stemmed from pride. It is not to be inferred that quality was reduced by technological advances. What happened is that we lost the extra quality which the workman put into his job through pride of his craft.

Industry managers have recognized this problem for several years. Many varied incentive plans have been developed as a result. Generally, these incentive systems use quality as well as quantity as a yardstick by which premiums are paid. A performance chart or a control chart, if posted in plain view, is another way of accomplishing the same objective, by arousing pride of workmanship. In this way, simplified quality control statistics in chart form help tell the worker how well he is doing his job. This method was adopted at Alcoa's Buffalo Works.

It is obvious that elaborate and technical charting and graphing would not have much meaning or appeal to most workmen. For this reason, simplified comparative bar graphs and cartoon posters were employed.

Melting Operation—The initial application of quality control in a form other than routine testing at the Buffalo Works was instituted in the melting operation. A method of preparing particular casting alloys in the melting room had been developed previously. In the experimental phase of this development, and at the outset of the production phase, off-composition melts were not encountered. Shortly after the shop alloying practice was put on a permanent

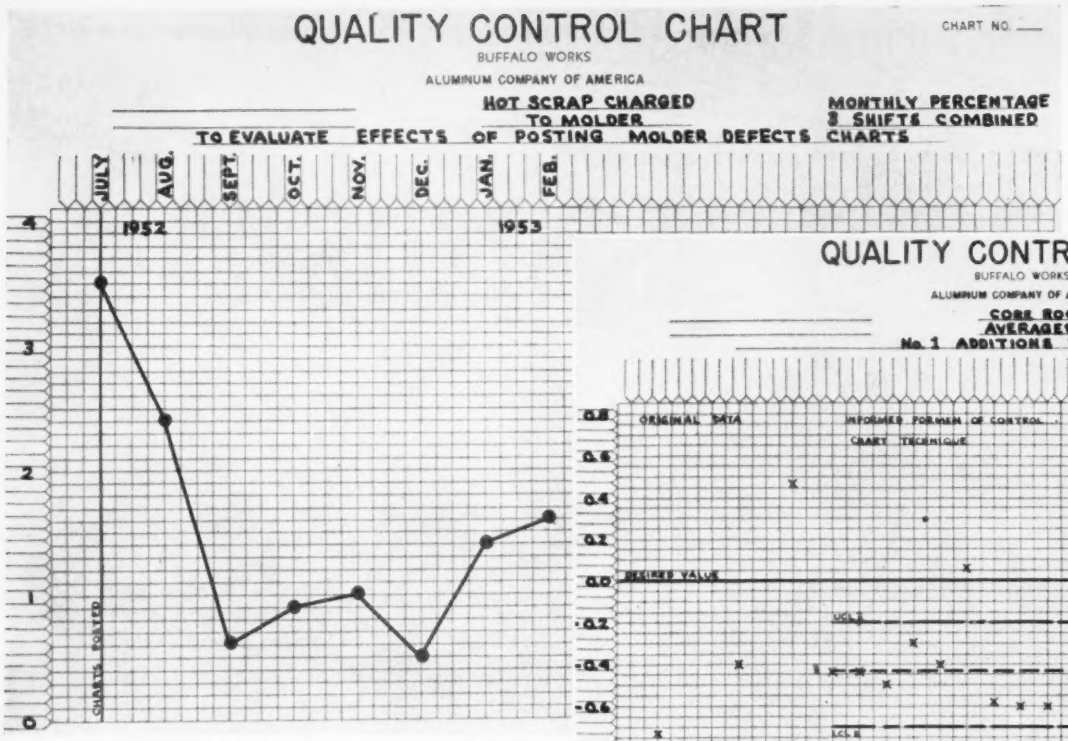


Fig. 4—Hot scrap charged to molder is decreased as a direct result of posting "Molder Defects Charts"

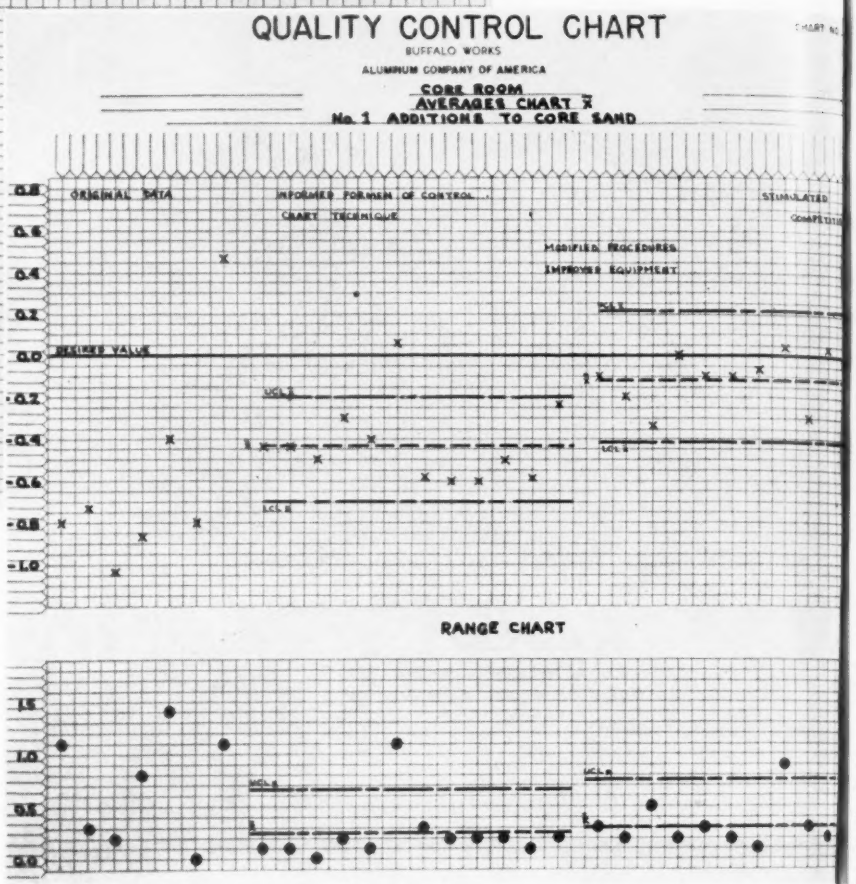


Fig. 5—Control chart for the core sand mixing operation on one shift

production basis, many melts outside of specifications were detected. Fortunately, through rapid analysis, the shop was able to correct off-analyses before they left the melting crucible. Considerable melting time was lost, however, because it was always necessary to reprocess these melts and then to reanalyze them.

In investigating this difficulty, it was found that the trouble stemmed from general carelessness, dropping the alloying elements, switching additions between furnaces, forgetting to put alloying elements into the charge and poor stirring. To correct this condition, the modified quality control program was initiated. In this case, the goal was achieved with very simple bar graphs, which were called "Shift Performance Charts" (Fig. 1). These compared the per cent of off-composition melts on each shift, and also the number of this type of charge prepared. Indicated at the bottom of each graph is the shift which had the best month.

The results of this approach were remarkable; off-composition melts were reduced to a trickle as is evidenced in Fig. 2. The feeling of pride and the competitive spirit were obviously infused. The foremen are now keeping their own private tallies and are constantly checking with the metallurgical department to

QUALITY CONTROL CHAR
BUFFALO WORKS
ALUMINUM COMPANY OF AMERICA
% SCRAP CHARGED TO CORE BLOWS
USED TO EVALUATE EFFECT OF CORE SAND
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN.
1952
1953
CHARTS POSTED

Fig. 6—Scrap chargeable to core blows was reduced by 41 per cent as the result of core sand control

learn how they stand in comparison to the other shifts. Two charts are still posted in the melting room. The one shown in Fig. 3 breaks down the percentage of off-composition melts by shifts, and another (Fig. 2) shows the trend of the over-all monthly per cent defective. Such charts have been maintained for a little over a year and have completely solved this problem. Every off-composition melt can be explained; many potentially poor melts have been eliminated because of the increased watchfulness of all concerned.

Molding Operation—A large portion of any scrap in a sand foundry is necessarily produced in the molding operation; and it is here that one can profit by employing some statistical tools. Simple bar graphs posted weekly, comparing the three shifts, again served the purpose at Alcoa's Buffalo Works. To avoid confusion, facilitate calculations and to eliminate a time delay problem, charts were posted denoting only the hot scrap (which is sorted out immediately) charged to the molder, thus keeping scrap and production current. This approach actually serves a dual purpose, because it makes it possible to check the effectiveness of the hot casting inspectors. If in assessing these data, too much scrap is found in process and final inspections, the hot inspector is at fault. Considerable savings can be realized by having good hot inspectors who pick out defective castings and get the information back to the molders before more castings are produced with similar defects.

The use of per cent defective, or p charts, based on daily production in the Buffalo foundry, also served to indicate the trends, so that foremen were armed with an added tool to indicate the need for concentrated action. The effect of posting these charts is shown by the downward trend of this type of scrap, as indicated in Fig. 4. Similar charts have been applied in the trimming and coremaking operations, resulting in comparable trends.

Sand Control—The first attempt at putting an operation into control by means of the most common tool of statistical quality control, the $\bar{X}$ and R chart, seemed futile at the outset, but once again the play on worker egoism and competition gave the assist necessary to attain the desired end. The first shop procedure to use this tool was the core sand mixing operation. In sand mixing, the worker adds specific amounts of various ingredients and processes daily approximately 300 batches of sand to varying specifications. The control procedure in the past consisted of spot checking batches of sand for one ingredient and cautioning the mixer if it was not close enough to specifications.

An analysis of the problem in the light of what was known about statistics, indicated that this was a likely place for an $\bar{X}$ and R chart. The complicating factor to this approach was that several ingredients were combined in varying amounts in several different mixes. It was reasoned that if one ingredient could be tagged, it would serve to keep the sand mixers alert, and would consequently tend to keep the other elements in the same control. To resolve the differences in formulation, samples were taken at random, regardless of type of core sand mix, and plotted on the charts on a basis of difference from the norm, or expected value. This method made it possible to use the same chart, whether the amount of material added to the mix was 2 lb, 4 lb or 6 lb.

This work was begun by developing a chart (Fig. 5) for only one shift, but such wide variation resulted that it was impossible to set up a sensible control chart. After checking the possible reasons for such wide variations, several improvements were made in the technique and the equipment used. These improvements symbolize one of the beneficial by-products of statistical quality control. In applying the system, defects in the sand mixing process were discovered which had been sedately taken for granted or overlooked.

After the recommended process changes were made, more data were collected which were within statistical control but still outside of the desired specification control. Further reprimands and threats would do little to cement employee relations; therefore, it was decided to set up charts for all three shifts and to post them in full view of the three operators. This brought out very clearly that only one operator was consistent and that excuses offered by the other two were without foundation. It took very little time after this became evident to bring the other shifts into similar control.

As evidence of what a control of this type can do to reduce defectives, scrap chargeable to core blows

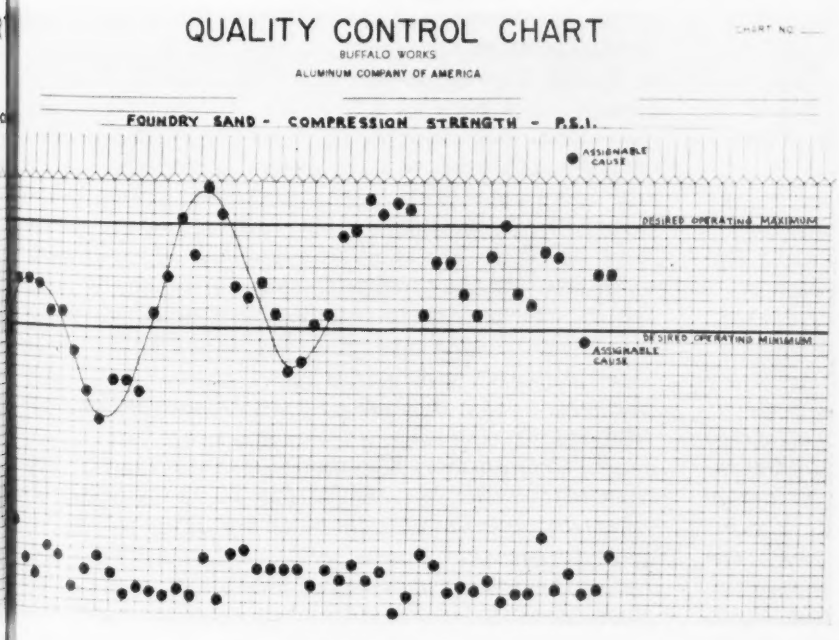


Fig. 7—Control chart, when used as a tool, gives rapid check on additions of binder to foundry sand

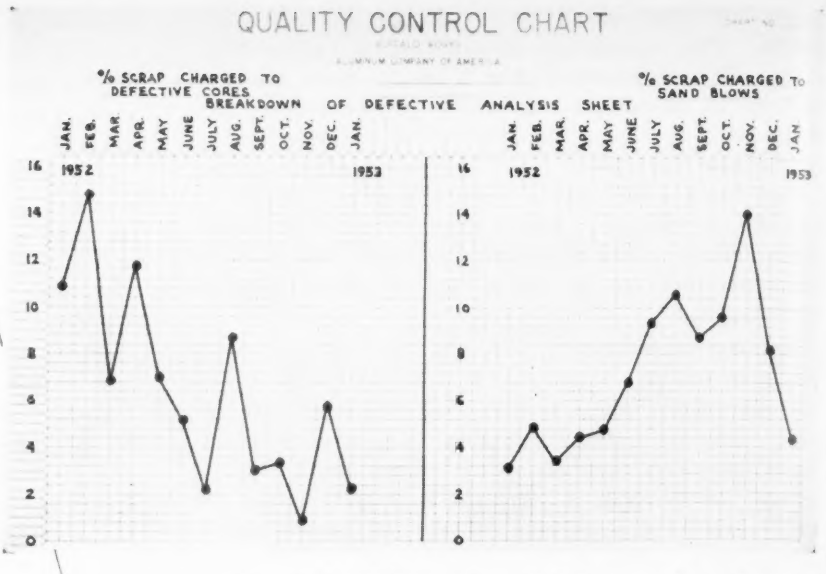


Fig. 8—Breakdown of a defective analysis sheet

Fig. 9—Mystery posters gain attention for the coming scrap rate signs

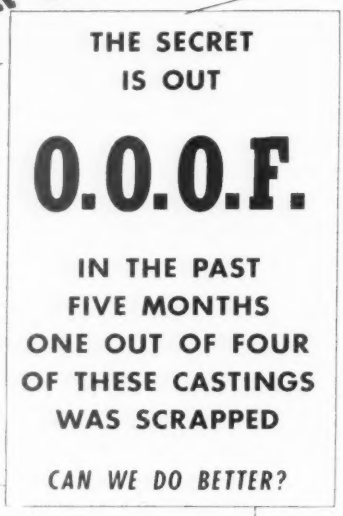
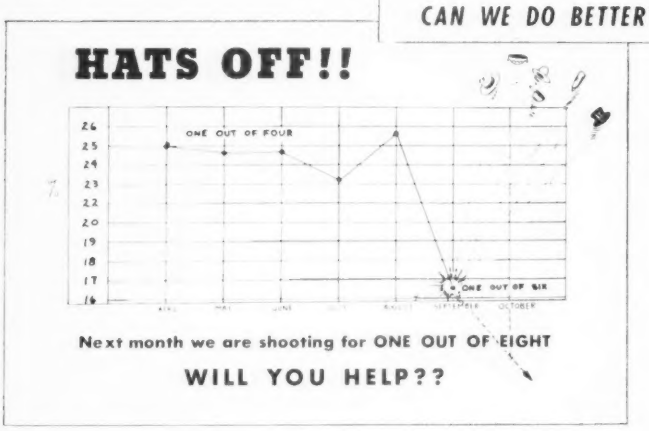


Fig. 10—Typical of the mystery solving posters

Fig. 11 — Finally, signs compliment workmen for reducing the scrap rate



was reduced by 41 per cent based on the average of the seven months prior to, and the six months following, the application of the control charts, shown in Fig. 6.

Foundry sand provided another problem which was solved by applying the control chart technique. It was believed that foundry sand at the Buffalo Works was in good control on the evidence of daily checks and changes to maintain the system. The question arose, however, as to whether this sand control was as good as believed. When control charts were developed, they pointed out that some of the sand properties held very well, while others were inconsistent. There was difficulty in keeping shear strength and compression strength within desired limits. When the test data were plotted, a very definite sine curve effect was noted. Investigation of this phenomenon brought out that the method of adding binder, on which compression depends, was the underlying cause. If the daily sand tests indicated that the compression strengths were near, or over, the upper specifications value as recorded in Fig. 7, binder additions were discontinued; and when the results dropped down to the lower specification, binder additions were reinstated.

By this method it was always possible to stay within reasonable limits. This practice provided an ideal situation for the development of the sinusoidal effect. The control chart, when used as a tool, gave more information more rapidly than by the old system and made it possible to make binder additions in a more logical manner.

Poster Charts—It was mentioned earlier that cartoon posters were used to notify workmen concerning the quality of their work. This direct presentation method has been used in several variations, among the more successful of these being the graph. Since graphs are not always easily understood, use at the Buffalo Works has been largely aimed at supervisors.

It has been the practice to make up a monthly scrap sheet which consists of the part number, pieces scrapped for each type of defect, pieces produced, total pieces scrapped, weight produced and total weight scrapped. This sheet still serves its purpose, but it is difficult to evaluate.

All the information contained on the scrap sheets is charted on graphs. By means of the graphs, the plant can establish trends of all the different types of defects, pick out the major sources of problems, pin point the departments or shifts which are lagging, and in general, tell a lot more about sources and causes of scrap.

The graph as shown in Fig. 8 in a limited space covers a period of several months; it would require wading through about 70 de- (*Please turn to page* 248)

Technical Reports at the

International Foundry Congress

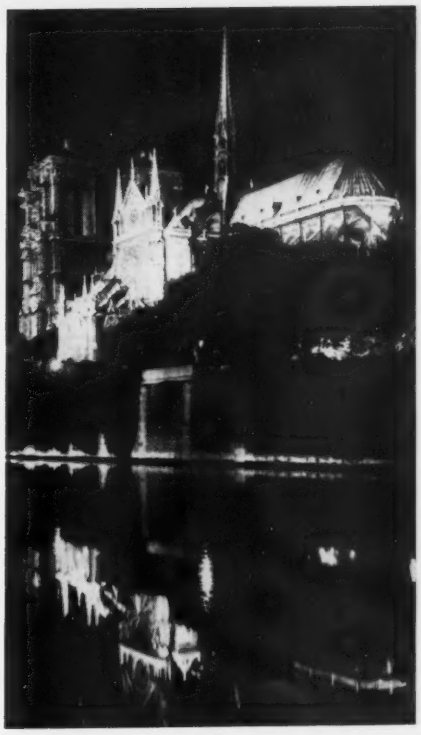


Photo Hallery, Paris

By VINCENT DELPORT
European Manager
FOUNDRY

SOME 70 papers, including ten official exchange papers, were presented and discussed during the technical session of the recent International Foundry Congress in Paris. These can be divided roughly into 15 groups, of which the most important was that on cast iron.

The Reclaiming of Iron Castings in Great Britain by Dr. A. B. Everest, Mond Nickel Co. Ltd., London, and F. A. Ball, Mond Nickel Research Laboratories, Birmingham. The paper reviews the work of Sub-Committee T.S. 23 of the Technical Council of the Institute, which has Dr. Everest as its chairman. The greater part of the report deals with repairs by welding. It is emphasized that this is a specialized job requiring skill. The various methods of welding, arc welding in particular, are reviewed and reference is made to the choice of electrodes and to the preparation of the casting before repair. Reference is also made to the method of welding by pouring molten metal. Machinability of the weld is also discussed.

Statistical Study of Comparative Analysis of Cast Irons, by Jean Gelain, assistant director of research Centre Technique des Industries de la Fonderie, Paris. Because the analysis of samples of one given cast iron made in different laboratories gives results that differ more than one should expect, the Centre Technique has devised a statistical method giving a margin of exactitude of 95 per cent. Tests were made with ten different samples, each of which was analyzed by from 80 to 95 laboratories. It is pointed out that certainty is greater still when the tests are made in the same laboratory and by the same operator.

A Method of Investigating Corrosion of Iron Castings, by Albert Levasseur, professor at Ecole Superieure de Fonderie and Ecole Superieure d'Electricite. The author explains a formula which permits of forecasting the degree of corrosion due to chemical action in solutions.

The Influence of Copper on Cast Irons Containing Magnesium, by R. M. Lamb, Mond Nickel Laboratories, Birmingham. Copper, if over 2 per cent in content, has an unfavorable influence on the nodular graphite of cast iron containing magnesium. Similar effects appear with an even smaller concentration of copper in low grade cast iron. The general conclusion of the paper is that cast iron alloyed with copper is less favorable to the addition of magnesium than nickel alloy cast iron.

The Influence of the Chemical Composition of Silicate Inclusions on the Properties of Gray Iron, by Dr. Andre Roos, Sedan, Ardennes, France. The author describes an electrolytic method of determining silicates and oxides, with destruction of carbides, phosphides and sulphides. The electrolysis takes place in a bromide solution. This method does not determine SiO_2; for this, iron turnings are attacked by a cupro-acetate solution. The author shows that inclusions decrease as the content of calcium increases. A formula is given to follow the variations of the modulus of elasticity for a given content of combined carbon, in relation to the content of phosphorus.

Production of Foundry Iron in the Electric Furnace in Norway, by J. Sissener. This paper begins with a review of the development of the electric furnace for producing pig iron in Norway. It goes on to discuss the use of electric pig iron as foundry iron. This iron has a high content of carbon, low phosphorus and sulphur, and a high content of alloying elements, particularly titanium and vanadium. It has a dense structure and its (*Please turn to page* 252)

HEAT TREATMENT OF STEEL CASTINGS

In this third and concluding article on heat treatment of steel castings, the Jominy test and effect of quenching and tempering are discussed. Previous articles appeared in October and November

By JOHN HOWE HALL

TO SPLIT hardened bars of different diameters and measure their hardness at a number of points, as was done in obtaining the data for Figs. 15 and 16 (November issue), is a slow and costly job. Hardenability, therefore, is now measured by means of the Jominy test, in which a bar of standard size is quenched in a device that directs a stream of water upon one end of the test piece, under standardized conditions. Two opposite sides of the bar are then ground flat to a depth of 0.015-in. and the hardness is measured at intervals of 1/16-in. from the hardened end.

A plot of hardness vs distance from the quenched end is then made, such as those shown in Fig. 17. In this chart are shown the hardenability curves obtained in this manner from four cast steels of low, medium and high hardenability, of the compositions shown in Table III.

The cooling rate of the Jominy bar at the quenched face is about 600° F per second, equivalent to that at the center of a ½-in. round bar cooled in agitated cold water, and less than 10° F per second at the other end, equivalent to the cooling rate at the center of a 4-in. round bar quenched in oil. American Society for Testing Materials' standard chart for reporting hardenability, shown in Fig. 18, gives the cooling rate in degrees per second, for each 1/16-in. interval on the Jominy bar.

From the hardenability curve of any given steel, it is possible to know the hardness that will be produced at various parts of the cross section of different sized pieces of that steel, by quenching in water or oil. Together, the S-curve and the hardenability curve make it possible for the metallurgist to prescribe with a high degree of accuracy the heat treatments that will give any given steel the desired combination of properties.

The alloying elements that increase hardenability the most are manganese, molybdenum and chromium. Silicon, phosphorus and nickel somewhat increase hardenability, while copper has but a slight effect. Carbide-forming alloys, such as vanadium and titanium, have a strong effect if the steel is heated before quenching to a high enough temperature to completely absorb the complex carbides they form. Sulphur decreases hardenability, and in most commercial steels in which only small amounts of sulphur and phosphorus are present, their effects cancel each other out.

For some unexplained reason, the effect of small amounts of several alloys is not exactly additive when 0.50 per cent of each of two alloys of approximately the same hardening power is present; their joint effect is greater than that of 1 per cent of either alloy alone. This has been made use of in the newer alloy steels containing small amounts of several different alloys, which were developed as a result of wartime scarcities of steelmaking alloys.

In a general way, the finer the ferrite-pearlite structure in a steel, the higher is its tensile strength, as well as the ratios of ductility and of yield point to strength. The lowest figures, therefore, are obtained when dendritic ferrite predominates, and a steady improvement in properties follows as the ferrite form changes to coarse blocky, to blocky network, and finally to Widmanstaetten; in other words, as one goes from right to left in Fig. 11 (November issue).

The finest structure of all, and the best combination of properties, results from cooling the steel fast enough to produce a high proportion of martensite, and then heating it to some temperature below the transformation range. During this "tempering" treatment the carbides in the martensite created by quenching coalesce and precipitate in particles of a size that varies directly with the tempering temper-

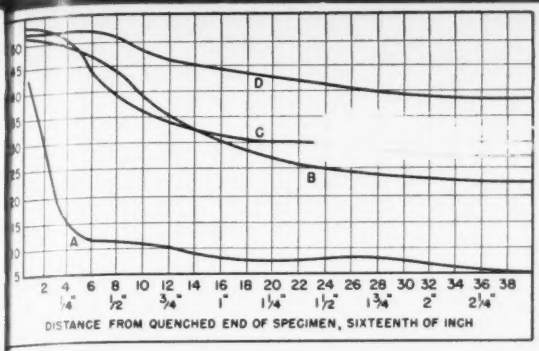


Fig. 17—Jominy curves of 4 steels. Steel Founders Society of America Report No. 1

TABLE III—Compositions for Steels in Fig. 17

No.	C	Mn	P	S	Si	Cr	Ni	Mo
A	.30	.75	.026	.040	.46	..	...	..
B	.28	.69	.043	.028	.41	.12	3.30	.03
C	.32	.54	.034	.021	.36	.75	.07	.27
D	.33	.69	.043	.028	.41	.72	1.41	.28

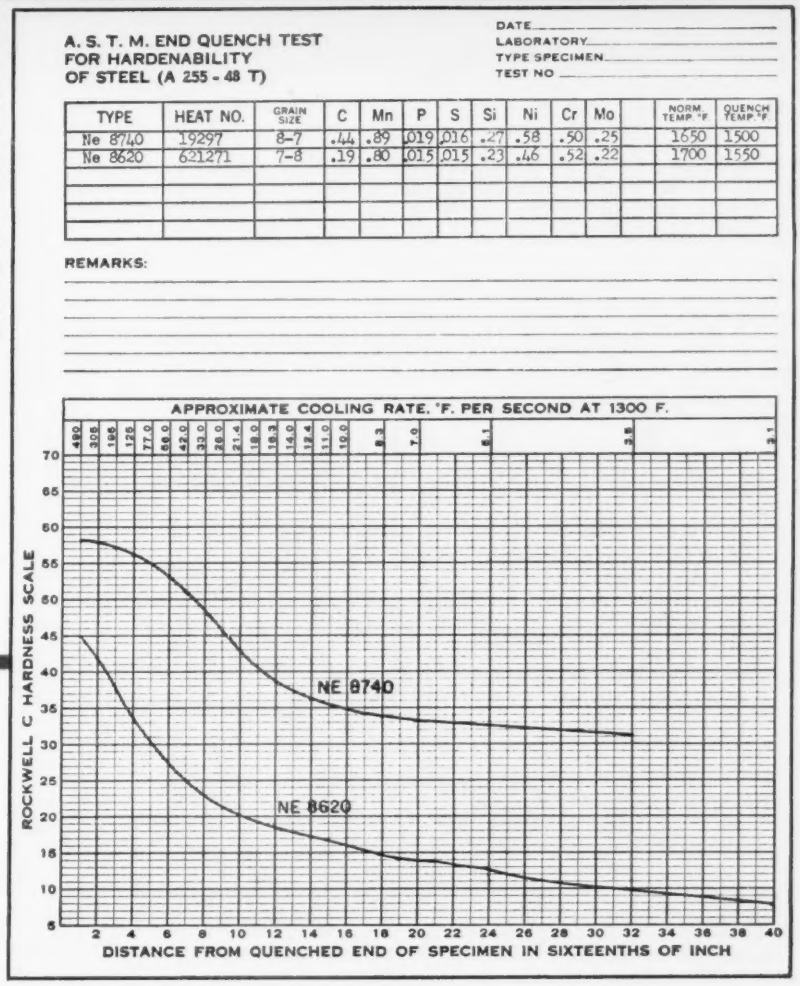

A. S. T. M. END QUENCH TEST
FOR HARDENABILITY
OF STEEL (A 255 - 48 T)
DATE
LABORATORY
TYPE SPECIMEN
TEST NO
TYPE | HEAT NO. | GRAIN SIZE | C | Mn | P | S | Si | Ni | Cr | Mo | NORM. TEMP. °F | QUENCH TEMP. °F
Ne 8740 | 19297 | 8-7 | .44 | .89 | .019 | .016 | .27 | .58 | .50 | .25 | 1650 | 1500
Ne 8620 | 621271 | 7-8 | .19 | .80 | .015 | .015 | .23 | .46 | .52 | .22 | 1700 | 1550
REMARKS:
APPROXIMATE COOLING RATE, °F. PER SECOND AT 1300 F.
ROCKWELL C HARDNESS SCALE
NE 8740
NE 8620
DISTANCE FROM QUENCHED END OF SPECIMEN IN SIXTEENTHS OF INCH

Fig. 18—Facsimile of the ASTM standard hardenability chart

ature. The martensite is thus transformed to a form of pearlite in which the particles of ferrite and cementite are too fine to be definitely resolved under the microscope at any but extremely high magnifications.

As the tempering temperature is increased, the carbide particles become larger, and the hardness and strength of the steel are decreased. Unless heated above the transformation temperature range, however, the ratios of the strength to yield point and of strength to ductility, as well as the resistance to impact, are much higher than those produced by any other heat treatment. Even if the microstructure of a non-quenched steel is as fine as that of a quenched one, the latter will have the better properties.

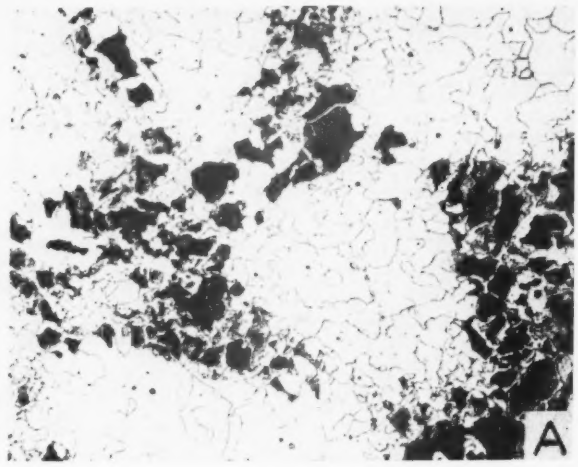
It would seem that so little martensite would be formed when ordinary cast steels are quenched and tempered, that there would be only a very slight improvement in their mechanical properties as a result of this treatment. It is apparently true, however, that except when the carbon content is below some 0.18 to 0.20 per cent, the beneficial effect of quenching plain carbon steels is far greater than would be supposed. Steels of 0.35 to 0.50 per cent C are benefited more by this treatment than are class B steels containing around 0.25 per cent C, but the effect is noticeable even in steels of the latter class.

Quenching in oil or water sets up heavy cooling stresses in steel, which may crack the piece if it is allowed to remain in the cooling medium until it is cold. Even if the quenching is interrupted at a temperature as high as 400 or 500° F, the stresses are quite severe. A secondary function of the tempering treatment is to relieve these quenching stresses so that the castings will not change shape during machining or subsequent handling.

A comparatively short holding at temperature would be sufficient for the relief of quenching stresses, but at the rather low temperatures used in tempering, the changes in the microstructure do not take place at once. This is especially true of low-alloy steels, since most of the alloying elements retard the rate at which martensite changes to finely divided ferrite and cementite. The castings, therefore, should be held for several hours at the tempering temperature after they have been heated through, though for any but very large complicated pieces, the 8 hr maximum recommended by the author in 1913 now appears rather extreme.

Even when the castings are normalized—that is, cooled from above the transformation temperature range in air or an air blast—a good deal of stress is set up in any but those of very simple shape. Steels containing more than very small amounts of alloy, too, are at least partially hardened by rapid air cooling. After normalizing, small castings of class B steel may be shipped without further heating, but large or complicated pieces, especially of higher carbon or low alloy steels, should be tempered, both to relieve stresses and to bring about some change in microstructure.

As in the case of water or oil quenched steels, the tempering temperature should not exceed the lower limit of the transformation range. If the heating is



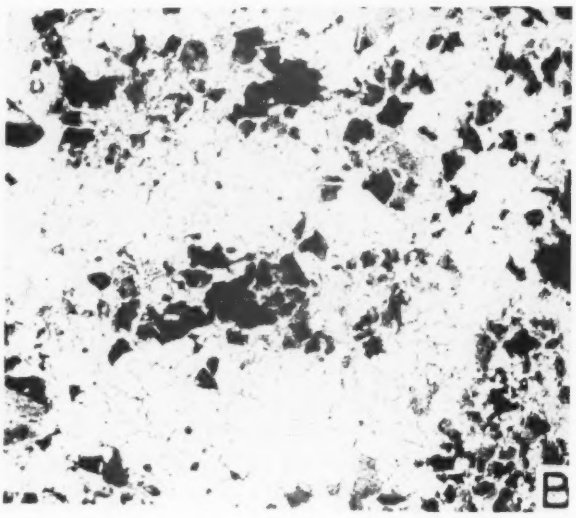
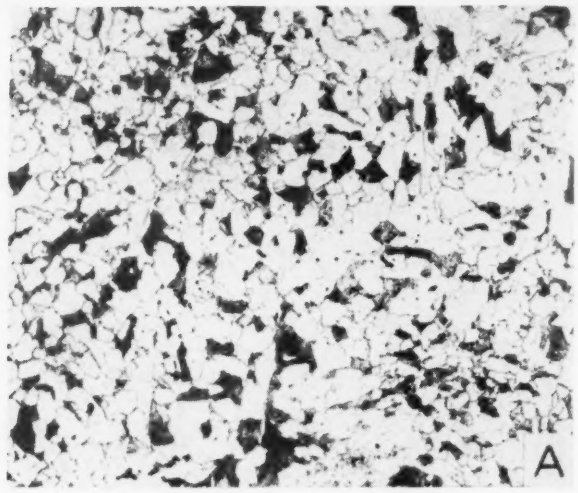


Fig. 19—Center *A* and corner *B*, 10 x 20-in. casting, slow cool. 100 X. *Transactions*, AFS, 1943



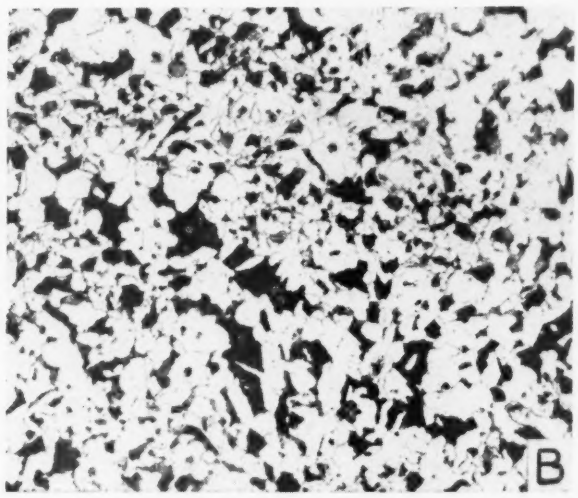


Fig. 20—Center *A* and corner *B*, 10 x 10 x 20-in. casting, normalized. 100 X. *Transactions*, AFS, 1943

carried to temperatures above the lower critical point, as the author showed many years ago[6], ferrite masses appear in the microstructure, whose size increases with the temperature and time of heating, and the strength-ductility ratio is markedly decreased. This ferrite separation appears to take place in the segregated areas left by the vanished pre-existing dendrites.

In the heat treatment of steel castings, normalizing or quenching, followed by tempering, are generally recognized as regular practice, but when the author first proposed them in 1913,[7] after five years regular use in practice, his ideas met with a decidedly cool reception. Quenching, especially, came in for scathing comment by older and more conservative metallurgists. The late Maunsel White, in conference with the author and the late H. M. Howe, put it quite simply: "The boy is just crazy, Howe"!

Others were nearly as frank in discussing the author's paper mentioned above. The late Frank Kenney said, "In Mr. Hall's paper, attention was called to the fact that a very much finer and better structure which would resist shock, was obtained by quicker cooling; in fact, the author *went to the extent of speaking of quenched castings.* (Italics are ours.) That is very true of the structure, but this procedure for most castings is not practical. In a practical sense, we must remember that while we may get excellent microstructure by rapid cooling, we may induce shrinkage strains in the castings which will ruin them as a whole." As the author had at that time successfully quenched and tempered some three or four thousand castings, varying in weight from 200 to 2000 pounds, Mr. Kenney's views were, to quote the late, great Finley Peter Dunne, "interestin" but not conclusive.

The stresses set up in quenching are almost completely relieved[8] in the subsequent tempering, so that if they do not actually crack the casting, they are not harmful. If a heavy or complicated piece is quenched in water until it is completely cold, however, it may crack in the water, or when an attempt is made to heat it again for tempering. For this reason, it is best to interrupt the quench when the castings have cooled enough for transformation to be complete, and at once place them in a furnace which is as near as possible at the same temperature as the castings.

After allowing the temperature of the furnace and of the charge of castings to equalize, the temperature may be slowly raised to the point at which it is to be held to complete the tempering.

A striking early example of the application of this principle to the quenching and tempering of quite large castings was observed by the author about 1914 at the (then) Pennsylvania Steel Co., Steelton, Pa. The late A. Russell Calder applied this treatment to a pair of Mayari steel locomotive side frames, with main members some 5 x 6 in. in cross section, which gave very satisfactory service. Quenched completely cold in water from 1850° F, these heavy pieces cracked in several places, but by interrupting the quench after seven minutes and placing the castings in a furnace at 500° F, they were successfully tempered at 1100° F, without any trouble from cracking. The partial analysis and mechanical properties obtained from coupons attached to these frames were as shown in Table IV (nickel and chromium content were not recorded in my notes).

Quenching Procedures Vary

When the sections of a casting vary too widely, it is difficult to water quench the heavy portions to the proper low temperature, without having the thinner parts become so cold as to be in danger of cracking, either in the water, or as they are reheated for tempering. When a casting tapers from one end to the other, it is possible to quench the whole piece until the thinner parts are cold enough, then raise it from the water a bit at a time, the thin portion first, the heavier parts being left submerged until they have cooled to the right temperature. The whole piece is then removed and placed in a furnace for tempering. When the sections vary widely and irregularly, however, this procedure may be impossible, and the casting may crack if quenched in water. In that case, the best solution is to make the piece of a more hardenable alloy steel, and treat it by quenching in oil and tempering, or by normalizing and tempering. For comparatively small work, oil quenching offers an easy solution, and should be resorted to if the desired properties can not be obtained by normalizing and tempering.

For really heavy pieces, such as are now being produced on a large scale, the cost of installing and operating oil quenching equipment of the required size would be prohibitive, and water must be used as the quenching medium. To obtain the desired resistance to suddenly applied heavy stresses, these castings must be made of an alloy steel, and be heat treated by quenching and tempering. As far as possible, inequalities of section are avoided in the design of these big pieces, but to quench and temper them without a certain amount of cracking requires careful manipulation.

To reduce the severity of the "thermal shock" due to quenching, the castings may be withdrawn from the heating furnace and cooled in air until they have nearly reached the temperature at which transformation begins, then lowered into the water. The temperature should be carefully followed with an optical pyrometer, because if the steel cools too much, transformation will begin and the water quench will not be fully effective.

TABLE IV—Side Frame Analysis

C	Mn	TS	YP	Ext. % 2"	RA, %
0.32	0.63	96000	58000	23.5	56.5
0.24	0.67	92500	62000	23.0	58.5

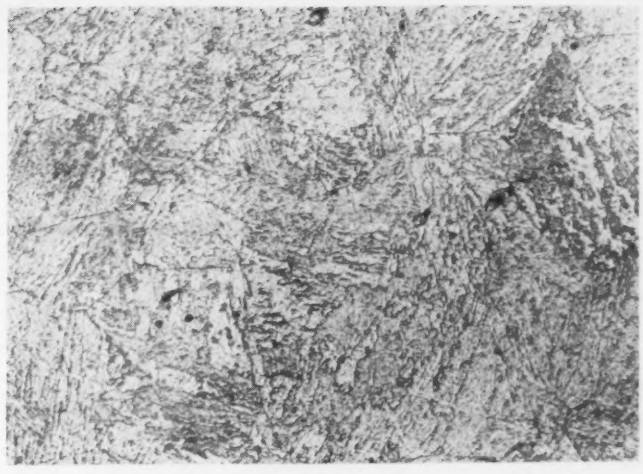


Fig. 21 — Widmanstaetten structure, according to Healey and Thomas. *Transactions*, AFS, 1947

In his early work, the author attempted this "delayed quench" practice, but was forced to give it up for lack of proper means of determining the temperature of the castings. Today, however, it is a very effective method. The castings are "time-quenched" and removed from the water after a predetermined interval. To be sure that they have cooled enough, and to establish the proper length of time in the first place, the temperature of the castings should be checked with temperature-indicating crayons or paints.

The chances of cracking a heavy piece may also be lessened by using a practice known as "interrupted quenching" or "step quenching". This consists in removing the casting from the water as soon as it has cooled past the "knee" of the S-curve, allowing it to cool in air until the temperature has fallen nearly to the lower part of the curve, and finally quenching again down to about 400° F. To do this successfully, of course, requires that the exact shape of the S-curve of the steel being treated should be known and that the temperature of the casting should be followed with great care.

Most of the low-alloy steels and some plain carbon steels are subject to what is known as "temper brittleness." The exact cause of this is not known, though it is supposed to be a form of "aging," similar to the hardening of duralumin and similar alloys. When heated after water or oil quenching, to temperatures between 850 and 1100° F, or cooled slowly through that temperature range after tempering at higher temperatures, steels that are subject to temper brittleness have very low resistance to sudden shock, as shown by impact tests.

Manganese, chromium and phosphorus greatly increase the tendency of (*Please turn to page* 194)

QUESTIONS

Melting of stopper rod due to carelessness

Bronze tablet gating

Mold must be dried

Must provide means for gas to escape easily

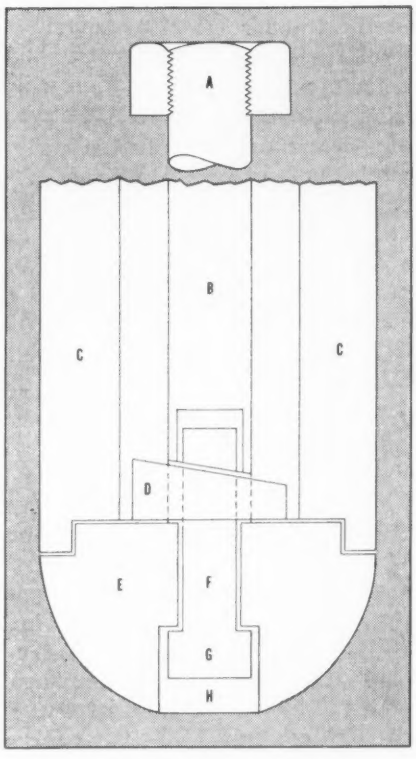
Stopper Rod Bolt Is Melted

QUESTION We have been using a 6-ton bottom-pour ladle for several years and average 50 molds to a heat. We never had any trouble until recently when the bolt holding the stopper to the rod began to melt. On several occasions it melted right off so that the rod pulled away and left the stopper head in the nozzle. We naturally assumed that the metal had leaked through the sleeve, but close examination showed that sleeve and stopper were in good condition, but the bolt was almost melted in two.

ANSWER It is possible, of course, that some unusual factor is responsible for the bolt melting off and leaving the stopper head in the nozzle, but we are inclined to the opinion that the accident is caused by carelessness or ignorance on the part of the man who prepares the stoppers.

The ordinary stopper is made up of a graphite plug *E* attached to a steel rod *B* by a bolt *F* and key wedge *D*. The assembly is protected from the metal in the ladle by a casing *C* of refractory sleeves provided with male and female joints at the ends. The stopper bolt, with a head at one end and a slot near the other end, extends through the graphite stopper and up into a suitable opening in the lower end of the stopper rod. A slot near the end of the rod corresponds to the slot in the stopper head bolt.

In making up the stopper rod the man runs the bolt *F* through the stopper *E* into the end of the rod and fastens it there with a steel wedge key *D*. The sleeve bricks *C* then are adjusted by placing a little slurry at each joint and bringing the male and female joints together. A nut *A* on the threaded end of the rod serves to tighten the assembly. After the assembly is complete the man fills the recess *H* in the stopper head surrounding the bolt head. This is the critical feature in all stoppers and the one that usually causes all trouble connected with



Must pack pocket *H* with refractory to prevent melting bolt head

the stopper head separating from the rod. Sometimes the man forgets to fill this opening with a suitable refractory compound. At other times he does not fill it properly and the result is that the plug falls out after the stopper is dried and before it is placed in the ladle.

Stoppers are dried in a vertical position, head down and suspended from the nut end. Unless some person examines the lower or stopper head end, the absence of the plug will not be noticed. The stopper will close the nozzle opening, but immediately after it is raised to pour the first mold, the molten steel will attack the unprotected bolt head *G* and melt it off in a short time.

Gating Large Bronze Tablet

QUESTION At various times and in several different publications we have read descriptions of how to gate large bronze tablet castings. Up to the present we have had no occasion to apply the information. Now we have an order for one of these castings and are undecided which gating method to adopt.

ANSWER A method that has found favor with many foundrymen may be described briefly as follows: The casting is gated on the back or cope side through three or four rows of small wedge gates, depending on the total area of the mold to be covered. Small wedges 1½ x 1½ in., ¼ in. at the top and tapered to ⅛ in. at the bottom, are set up 8 to 10 in. apart in straight rows on the pattern and a thickness of sand is rammed around them to hold them in place.

A length of 1-in. steel pipe is laid horizontally on top of each row of wedges and partly covered with rammed sand. The pipes are removed temporarily so that the wedges may be lifted out. The pipes then are returned to place. An upright sprue is placed on each pipe and, if necessary, slanted to a common center so that the entire set of runners may be served from one pouring basin in which the sprue may be plugged until the basin is filled with metal. The horizontal pipes are pulled through suitable holes in one end of the flask. The holes afterward are

? ANSWERS

plugged with small cores.

Suitable sand is made up by mixing equal parts French sand and No. 00 Albany, tempered properly, rammed hard and dried. A solid substantial cope is essential. After the mold is closed, binders are clamped across the cope and the bars are wedged on top to prevent them from rising. Wedges are placed between the drag and the bottom board or bottom plate. If the bottom board or plate is not adjusted properly there is danger that the clamps will pull it up in some places and thus shut off the mold thickness in one or more places.

Proper Mold Drying Required

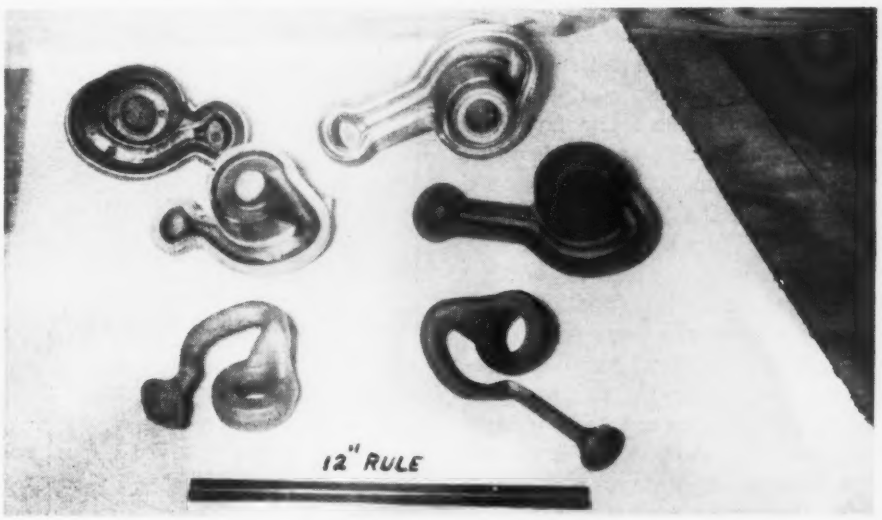
QUESTION We would like information on how to compound metal casting plaster from ordinary plaster of paris since the former is not available locally and we only need small amounts from time to time. Is it possible to dry plaster molds on top of an oil-fired crucible furnace? Molds are for aluminum castings.

ANSWER We believe that you would be much better off to purchase a small quantity prepared metal plaster and keep it on hand rather than to try to prepare your own material since its storage properties are the same as gypsum plaster. Usual metal casting plaster is composed of 4 lb of plaster and 1 lb of fibrous talc, a type of soapstone. One pound of terra alba (kaolin or china clay) is added to 100 lb of the previous mix as an accelerator. All materials are mixed thoroughly in the dry state.

We do not believe that you can dry plaster molds properly on top of a crucible furnace since it usually requires 12 to 24 hours at 300 to 400° F to obtain suitable dryness for pouring of metal.

Gas From Core Cannot Escape

QUESTION We are enclosing a photograph showing two cores for gas range burners with the coreboxes and driers used in blowing them. We are not experienced with this type of casting and have had continual trouble with the castings blowing along the top of the core. We have used a silica sand of 50 AFS fineness and have tried ratios from 60 to 160 to 1 of linseed-base core oil. There are no prints on the cores; flat surfaces on both the large ring ends and the small valve ends rest on the drag surface of the molds. Cores are held down with perforated chaplets. Metal thickness is 3/16-in. We will appreciate any recommendations of mixtures, sand, and techniques.



Photograph showing two cores for burners with coreboxes and driers used in blowing them. Cores have no prints and rest on drag surface

ANSWER Your difficulty arises from the inability of the gases generated by contact of the hot iron with the core, to escape, and that will have to be corrected to insure successful castings. The sand you are using is sufficiently open, and even with the low ratio of 60 to 1, the amount of oil would not be too excessive, although for economical reasons it is preferable to use the least quantity which will permit usual handling.

Most burner cores have a print at the so-called valve end, and usually a vent through that as far up the tube as possible. From your description we gather that the port for the entrance of air into the burner is at the top of the enlarged or valve section, and is formed by the flat area you mention. Also the burner as cast is open around the top of the ring, and when in use is closed with a perforated plate for the emission of the gas-air mixture.

Since the flat area of the ring and that on the core rest on the drag mold, it will be necessary to take away the gases from the core at those areas since they are the only ones available for venting. Evidently the sand is rammed too hard to permit the gases to escape readily, so we suggest running the vent wire completely through the drag in those areas. Then see that

the vents get to the outside of the mold either by use of perforated bottom boards, or scratch vents across the bottom of the mold to the outside edges.

Stove Castings Crack and Warp

QUESTION Is it practical and possible to make stoveplate patterns, end shelves and closet fronts in such a manner the castings will come straight and true without a crack or warp? What do you think of butting the sand between the bars as a remedial measure after a casting is poured?

ANSWER To the first part of your question the answer is yes, it is possible and practical to make patterns for shelves and closet fronts that will not cause the castings to crack and warp. The proof of this is that these castings constantly are made in many foundries.

As for suggesting a remedy or a course of action for your present trouble, that is a more complicated problem. So many factors exert a direct bearing on the subject, examination by a properly equipped person would be necessary before a person could arrive at a decision or prescribe a remedy. In some cases the shape of the pattern is directly responsible for a warped casting. The remedy you refer to, butting the sand in certain parts of the cope, sometimes is employed to prevent this condition. In comparatively few instances the iron may be responsible for cracked castings, but usually warped castings and cracked castings may be traced to a faulty gating system.

Roll Core Cause of Explosion

QUESTION The hollow cast iron roll shown in the accompanying illustration has been the cause of considerable trouble. These rolls are made in different diameters from 6 to 8 in., in lengths from 18 to 40 in. and ⅜-in. thickness of metal. The chills are heated before we cast the rolls in a vertical position. Just before the mold is filled, a violent explosion throws large quantities of iron out through the gate. The iron also solidifies before the mold is filled, resulting in castings imperfect at one end.

ANSWER We are inclined to the opinion that the vent from the core is not getting away as freely and rapidly as it should. From your statement that the chills are heated before they are used, we infer that a similar precaution is observed with the central steel shaft. As a further precaution the shaft areas in contact with the molten metal in the three hubs should be polished clean and bright and covered with a thin coating of oil.

We assume that the core is made in a half corebox and later the half cores are pasted together. We suggest boring two holes in each end of the corebox as shown in Fig. 2. Run a ½-in. rod from end to end of the box before putting in any sand. When the core is rammed

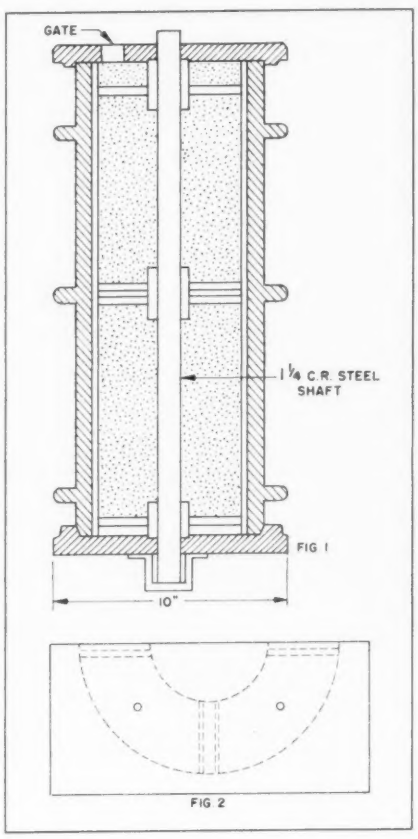


Fig. 1—Mold with core and steel shaft in position. Fig. 2—End of corebox showing vent rod holes

and the corebox is turned over on the plate, the rods are pulled out and the box is lifted off. The holes will provide a free vent for the core and should be connected to suitable openings in the cover plate.

The style of gate shown in the sketch is not all that it should be. A more satisfactory method would be to pour the metal through a basin feeding four pop gates 1 x ¼-in. equally spaced on top of the rim.

Aluminum Castings Are Porous

QUESTION We are making some chunky pattern castings in an aluminum alloy and are having trouble with porosity. We use a crucible furnace, oil-fired with heated air and manually controlled, and believe we do not have proper control of combustion. How can we obtain such control? We employ No. 0 new Albany sand and watch the moisture content closely. In melting we use a proprietary flux or degasifying agent. Can you offer any suggestions?

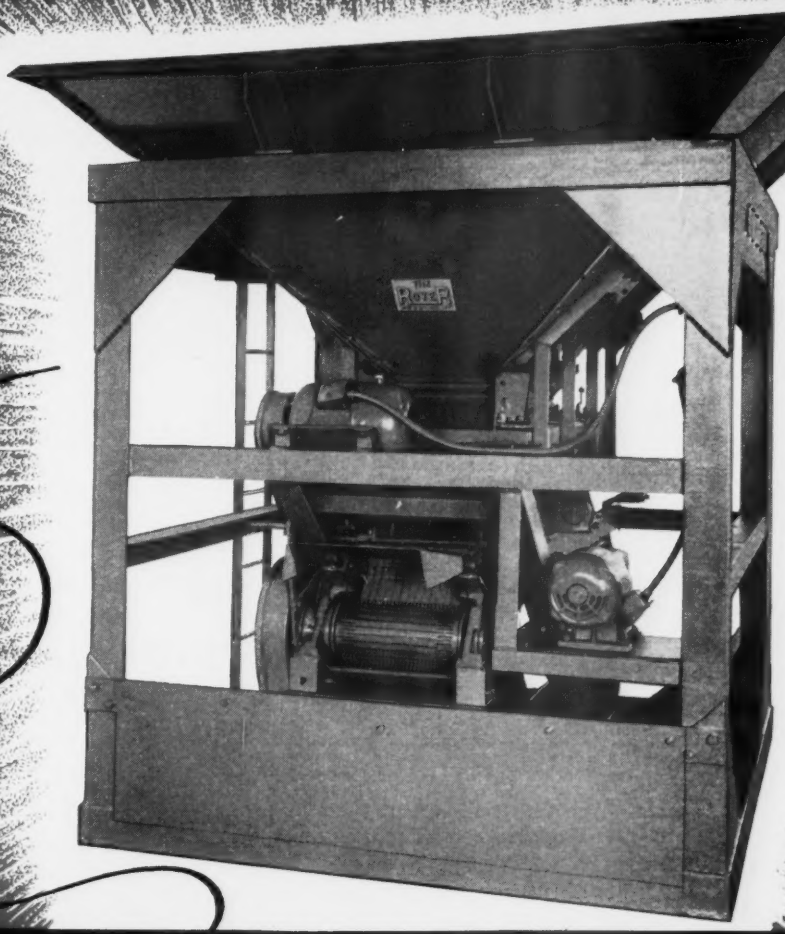
ANSWER Proper method of determining whether or not the furnace atmosphere is oxidizing, neutral or reducing is to analyze the gases of combustion by means of an Orsat apparatus which can be obtained from any chemical supply house. However, a simple method which is claimed by many to give a satisfactory indication is to take a piece of slab zinc and pass it through the flame for about 5 seconds. If the zinc turns black or shows soot deposit, the flame is reducing—that is, it lacks oxygen. If the zinc remains clean, the flame is neutral or slightly oxidizing, and if a straw-yellow deposit occurs, the flame contains about 0.5 per cent oxygen. In nonferrous melting the flame preferably should be the last named.

Elimination of porosity involves considerable attention to details, and it is possible that somewhere along the line, something is being overlooked. You mention that you are using manually controlled burners, and it is quite possible that the operators do too much tinkering. Proportioning burners would eliminate some trouble from that source, especially if the operators are instructed to leave hands off after they have been properly set—or the valves are locked.

Temperature control of some type also is important. As you know, the higher the temperature to which the aluminum is heated the greater the gas pickup, and the longer it stays in the furnace the same thing occurs. You indicate that you are pouring heavy and light section castings from the same pot. That is bad practice since the metal should only be heated to a temperature sufficiently high to permit pouring a given section. Hence, you

(*Concluded on page* 134)

Built-in MAGNETIC SEPARATION



in the *IMPROVED* ROYER COMBINATION

Make better castings by using better sand . . . reduce rejects due to blows, skids and surface inclusions by using properly conditioned molding sand . . . sand prepared the Royer way.

The Royer Combination Scrap Remover and Sand Separator & Blender is a complete sand conditioning unit. Sand is loaded into the hopper and is then fed into a Scrap Remover where heavy refuse is removed. By means of a conveyor belt, sand then passes over a magnetic pulley (a recent addition to the Combination) where scrap including nails and shot is removed. This double refuse removal assures you of clean, trash-free molding sand.

Additionally, the sand is given the Royer 6-point sand conditioning and is discharged properly and thoroughly prepared, aerated and blended.

Models available in 20 to 25 ton and 30 to 50 ton capacities. Write for complete information.

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

(*Concluded from page* 132)

will obtain much better results by pouring heavy and light section castings from pots heated to different temperatures.

Metal should not be stirred violently, and should enter the sprue without splashing or agitation. Pot or crucible lip should be as close to the sprue opening as possible to prevent air entrainment in the metal stream. We note that you are using a degasifier and a cover. It might be pointed out that covers keep gases in as well as out, and suggest you try leaving the cover off and note the results.

Are you following the manufacturer's directions relative to application of the degasifier, and are sure that the material is kept dry? Such materials tend to pick up moisture if left exposed to the atmosphere, and consequently will not function properly.

Possibly the gating systems on the castings need some attention. They should be such as to admit the molten metal to the cavity with the least agitation and turbulence. Preferably multiple gating should be used since a lower pouring temperature can be used.

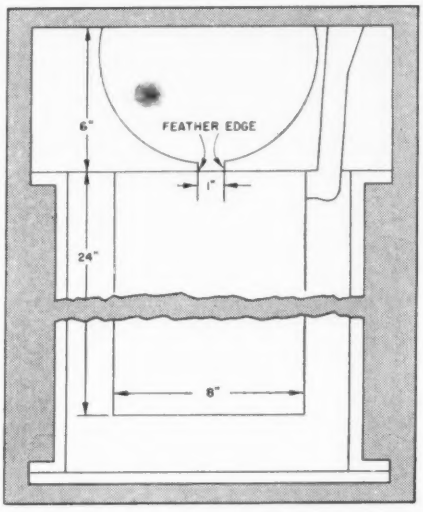
Producing Solid Castings

QUESTION We are having difficulty with cast iron blocks 8 x 8 x 8 in. which must pass x-ray examination. Defects include internal shrinkage, inclusions and shrinkage where gate and riser join the casting. Approximate analysis shows 2.00 per cent Si; 0.145 per cent S; 0.21 per cent P; 0.43 per cent Mn; 3.05 per cent TC.

ANSWER Technique employed in a foundry in this district for casting gray iron slugs 8-in. diam 24 in. long might serve your purpose. Molded two in a flask, the metal is poured through a plain gate at the top side. Type or size of gate is a minor factor so long as the sand does not wash.

The distinctive feature is the feeding riser. This is a dry sand core, as shown in the accompanying sketch, which also serves as a cope. Metal is poured into the mold until it touches the covering core. Then the basin in the core is filled with fresh, hot metal. If necessary, the metal in the sprue and gate is cooled with a dash of water before the feeding basin is filled.

These castings are made of a process iron to insure a dense, even, homogeneous structure. We doubt very much that you can get the same result with ordinary gray iron as shown by your given analysis. The casting may be sound and solid, but the grain size in the center will be much coarser than the grain at and near the surface. An over-zealous inspector probably would seize on that feature to condemn the casting. Silicon content should be about one-half that shown. Metal in the basin is covered with silocel, blacking, charcoal or any other suitable insulating material.



Sketch shows method used in producing solid gray cast iron slugs

Government - inspected castings involve a great deal more expense than ordinary perfectly serviceable castings. This feature should be taken into account in submitting tenders.

Make Castings To Resist Wear

QUESTION We have been supplying button castings which are attached to cables for conveying logs in a pulp mill. The cupola charge for these castings is made up of 200 lb pig iron, 200 lb steel scrap and 600 lb gray iron scrap. The customer complains that these castings wear out rapidly. The pig iron has a silicon content 2.70 per cent. What change would you suggest to produce more wear resistant castings?

ANSWER Hardness and wearing qualities of your present mixture may be increased by reduction of the silicon content. The cupola charge may be made up in several ways depending on the varieties of iron in the stock yard. The silicon content in the present mixture is approximately 2.00 per cent. This is too high for castings subject to wear and abrasion.

The silicon content may be reduced either by (a) reducing the amount of the high-silicon pig iron, or (b) by using the present amount —200 lb—of a lower silicon pig, or (c) by increasing the amount of steel scrap to 300 lb and reducing the amount of cast iron scrap to 500 lb. Have the cupola man pick out the cast iron scrap and use only the low-silicon variety such as car wheels, railroad, and a sprinkling of malleable iron scrap if you have it. Superior resistance to wear and abrasion is claimed for nickel-chromium alloy iron provided your customer is willing to pay the additional cost of alloy material.

Dimensions for Small Cupola

QUESTION Can you supply us with construction details for a cupola with a 30-in. shell? What should be the height of the charging door above the bottom, and how high should the legs be? Any other information on location of tuyeres, slag hole, etc. will be appreciated.

ANSWER The numerous details relative to cupola dimensions and their operation may be found in the *Handbook of Cupola Operation*. Briefly the following relates to a cupola with a 30-in. shell:

The shell is ⅜-in. steel plate from bottom plate to charging door and ¼-in. plate above. From tuyeres to charging doors the distance should be about 15 ft. Legs should be about 5 ft high to permit easy access for chipping out and patching the lining. Windbox may be of ⅛-in. plate from 10 to 12 in. deep or wide and 3 ft high. Tuyeres should be about 20 in. above the bottom plate, using a 4-in. thick sand bottom.

The well area (16-in. deep) will hold around 560 lb of molten iron or two charges. Coke splits should be 35 lb. Four tuyeres, 4¼ in. high and 5 in. wide, should give a suitable ratio for cross-sectional areas of tuyeres and the well. Slag hole may be 4 to 8 in. below the bottoms of the tuyeres.

PROGRESS REPORT ON NATIONAL CARBON
TRADE-MARK
BLAST FURNACE LININGS

One out of every *three* blast furnaces in this country is now lined with "National" carbon. With this outstanding acceptance of carbon as a blast furnace refractory, let's take a look at its remarkable performance *over the long haul.*

Here are the facts:

- *23* "National" carbon-lined furnaces have each produced over *2* million tons.
- *5* of these have passed the *2½* million ton mark.

These are all original linings — *and still going strong!*

Every year more "National" carbon goes in... more unit tonnages go up and costs come down... more operators learn what *smooth* operation really is.

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York, 17, N. Y.

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

IN CANADA:
National Carbon Limited—Montreal, Toronto, Winnipeg

NATIONAL CARBON PRODUCTS

CARBON LININGS FOR FERRO-ALLOY FURNACES • CARBON MOLD PLUGS • GRAPHITE THERMOCOUPLE SHEATHS • GRAPHITE STARTERS FOR HOT-TOPPING • CARBON CINDER NOTCH PLUGS • GRAPHITE AND CARBON CORES • GRAPHITE RISER RODS • CARBON BOXES AND GRAPHITE POWDERS FOR HEAT-TREATING • PIPE AND FITTINGS • CARBON BRICK • PUMPS • CONDUCTOR ROLLS • SPECTROSCOPIC ELECTRODES • STEAM JETS • ANODES

Men of Industry

HARRY E. GRAVLIN, elected chairman of the Detroit Chapter of the American Foundrymen's Society for 1953-54, is production manager of the Dearborn Iron Foundry, Ford Motor Co. Mr. Gravlin was graduated from Wayne University with a B.S. degree in chemical engineering, and received master's degrees in automotive engineering from University of Michigan and in industrial management from Massachusetts Institute of Technology. In 1949 he was one of ten men selected by the Sloan Foundation for a year's training in industrial management. He joined Ford 14 years ago and has served in the engineering and production departments and main laboratories. Previously he was associated with Aircraft Engine Division, Continental Motors, Muskegon, Mich. Mr. Gravlin was vice chairman of the Detroit Chapter last year.

♦ ♦ ♦

Richard G. Tessendorf, for the past year general works manager of plant operations, Aluminum Industries Inc., Cincinnati, has been elected a vice president. Mr. Tessendorf joined the time study department of the company in 1933 and advanced through the production and sales offices to sales manager of the manufacturing division. He is a vice chairman and director of the Aluminum Association.

♦ ♦ ♦

Joseph Glyman and **Henry Lanthier** have joined the supervisory staff of the investment casting plant, Bone Engineering Corp., Glendale, Calif. Mr. Glyman, a graduate of University of Toronto, was formerly associated with Misco Precision Casting Co., Detroit, and National Lead Co., New York. He previously operated his own investment casting plant. Mr. Lanthier, assistant to Mr. Glyman, has been associated with Kerr Mfg. Co., investment casting division, and American Precision Casting Co., both of Detroit.

♦ ♦ ♦

Harold G. Leibold has been named a director and **George S. Love,** secretary-treasurer, Silica Chemicals Inc., new Subsidiary of Cleveland Quarries Co., Amherst, O. Mr. Leibold has had 18 years service as a sales engineer and manager of refractory sales for the parent company. Mr. Love has served as auditor, controller and assistant secretary of Cleveland Quarries during 25 years of association with the firm.

♦ ♦ ♦

Joseph D. Brubaker has been named treasurer and a director, Standard Horse Nail Corp., New Brighton, Pa., succeeding the late A. L. Bingham.

♦ ♦ ♦

Alton W. Bardeen, formerly chief metallurgist, has been appointed technical director, Ohio Brass Co., Mansfield, O., succeeding the late Richard W. Parsons. Mr. Bardeen was graduated from Case Institute of Technology and joined the company in 1951, following service with the U. S. Marines during World War II. He is a member of the American Society for Metals and the American Foundrymen's Society.

♦ ♦ ♦

Neil Pohl, for the past year and a half industrial sales manager in the Kansas City, Mo., branch of the tractor division, Allis-Chalmers Mfg. Co., Milwaukee, has been named motor grader sales manager of the division's industrial sales department. Mr. Pohl attended University of Wisconsin and joined the company's industrial sales department in 1948. He was assistant industrial sales manager in Kansas City and industrial sales manager in the Canadian branch of the tractor division until 1952.

♦ ♦ ♦

Col. John Slezak, assistant secretary of the Army, and president, Turner Brass Works, Sycamore, Ill., was recently awarded the General

(*Continued on page* 138)

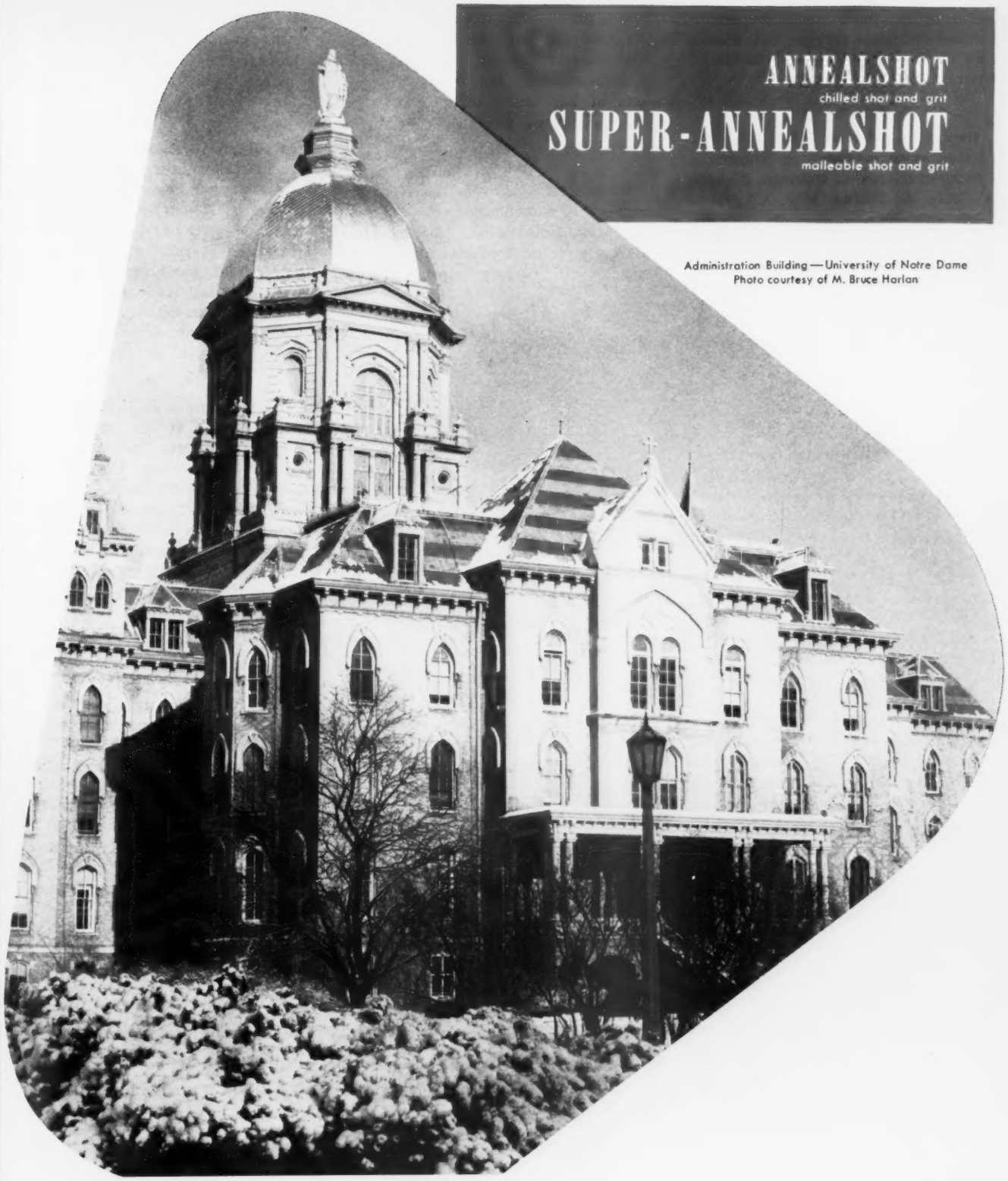
HARRY E. GRAVLIN
. . . Detroit Chapter Chairman

RICHARD G. TESSENDORF
. . . v. p., Aluminum Industries

JOSEPH GLYMAN
. . . joins Bone Engineering

HENRY LANTHIER
. . . engineering castings

ANNEALSHOT
chilled shot and grit
SUPER-ANNEALSHOT
malleable shot and grit



Administration Building—University of Notre Dame
Photo courtesy of M. Bruce Harlan

SOUTH BEND

FOUNDRY MARKET AREA NUMBER TWELVE

In addition to being the home of one of the most famous educational institutions in the country, South Bend is also distinguished as one of the top twelve foundry market areas. It boasts several large foundries, six of which employ over 500 people, specializing in automotive, agricultural and machine tool castings. Total employment exceeds 10,000 and the area's 72 foundries turn out better than a half million tons of castings annually. As in other leading foundry centers, many of South Bend's gray iron foundries prefer ANNEALSHOT and/or SUPER-ANNEALSHOT because of their unusual ability to keep cleaning costs to a minimum. Call your Metal Blast representative for information on these efficient abrasives, or write direct to **METAL BLAST, Inc.**, 872 E. 67th St., Cleveland 3, O.

Statistics from Penton's HOW TO SELL THE FOUNDRY MARKET

(*Continued from page* 136)

Levin H. Campbell medal for distinguished ordnance service. Col. Slezak was chief of the Chicago Ordnance District in World War II.

♦ ♦ ♦

George A. Hinckley has been appointed sales manager of Automatic Transportation Co., Chicago, division of Yale & Towne Mfg. Co., New York, succeeding **Robert M. Whitney,** who has become national advertising and promotion manager of the parent company. Mr. Hinckley, a graduate of Harvard University, has been sales manager for Automatic's New York factory branch for 3 years. Prior to that he was in the sales department of the Chicago home office.

♦ ♦ ♦

Charles W. Snyder has been named district sales manager in Delaware and parts of New Jersey and Pennsylvania for DeWalt Inc., Lancaster, Pa., subsidiary of American Machine & Foundry Co., New York. With DeWalt since 1939, Mr. Snyder worked as field service engineer, assistant plant superintendent, special installations division head, and joined the sales department in 1950.

♦ ♦ ♦

Kenneth U. Jenks, secretary-controller, Lindberg Steel Treating Co., Melrose Park, Ill., was elected a trustee of the Metal Treating Institute at its annual meeting in Cleveland.

♦ ♦ ♦

Lee L. Edwards has been appointed general manager of A. P. Green Fire Brick Co. of Texas, new direct representative and distributor organization of A. P. Green Fire Brick Co., Mexico, Mo. Mr. Edwards has been associated with the company over 25 years in factory, office, sales operations, and as an executive in distributor organizations. **Ed C. Miller,** previously sales supervisor for the company in Mexico, Mo., has been named district sales manager in Indianapolis. Mr. Miller, a graduate of University of Missouri, has been in Green fire brick sales for many years.

♦ ♦ ♦

Gordon W. Johnson, formerly supervisor of foundry research, Armour Research Foundation, Chicago, has been appointed associate project director on casting design-process manual, Alloy Engineering & Casting Co., Champaign, Ill. For 12 years Mr. Johnson was chief metallurgist, American Hoist & Derrick Co., St. Paul. He is a past chairman of the Northwest Chapter of the American Society for Metals, and served as an officer in the Chemical Warfare Reserve.

GORDON W. JOHNSON
. . . joins Alloy Engineering

♦ ♦ ♦

Robert J. Langan and **Donald W. Greve** have been appointed grinding wheel sales representatives, Electro Refractories & Abrasives Corp., Buffalo. Mr. Langan has been assigned to the New York metropolitan area. Mr. Greve, formerly in Albany, N. Y., with Aluminum Co. of America, Pittsburgh, will cover Pittsburgh, western Pensylvania and West Virginia.

♦ ♦ ♦

Leslie B. Bellamy, since 1946 Detroit district manager, Sterling Abrasives Division, Cleveland Quarries Co., Amherst, O., has been named general manager of the division, in Tiffin, O. He joined Sterling Abrasives as technical field engineer in 1944. Mr. Bellamy was national president of the American Society of Tool Engineers last year, and chairman of its Detroit chapter in 1947.

♦ ♦ ♦

Dr. Alexander R. Troiano has been named head of the department of metallurgy, Case Institute of Technology, succeeding the late Prof. Kenneth H. Donaldson. Dr. Troiano was graduated from Harvard University, where he received his master and doctor of science degrees. He was instructor in Harvard Graduate School for two years and prior to going to Case was professor and acting head of the metallurgy department, Notre Dame University.

♦ ♦ ♦

Earl White, chairman of the Corn Belt Chapter of the American Foundrymen's Society for 1953-54, is field representative, M. A. Bell Co., St. Louis. Mr. White began his apprenticeship at the age of 15 in Logansport, Ind. During over 50 years in the foundry industry he was associated with Atlas Engine Works, Indianapolis, Union Steam Pump Co., Battle Creek, Mich., New Way Casting Co., Council Bluffs, Iowa, Paxton & Vierling and Paxton-Mitchell Co., in Omaha, Neb. Mr. White operated his own foundry from 1925-1930 in Gering, Neb. Following re-

(*Continued on page* 140)

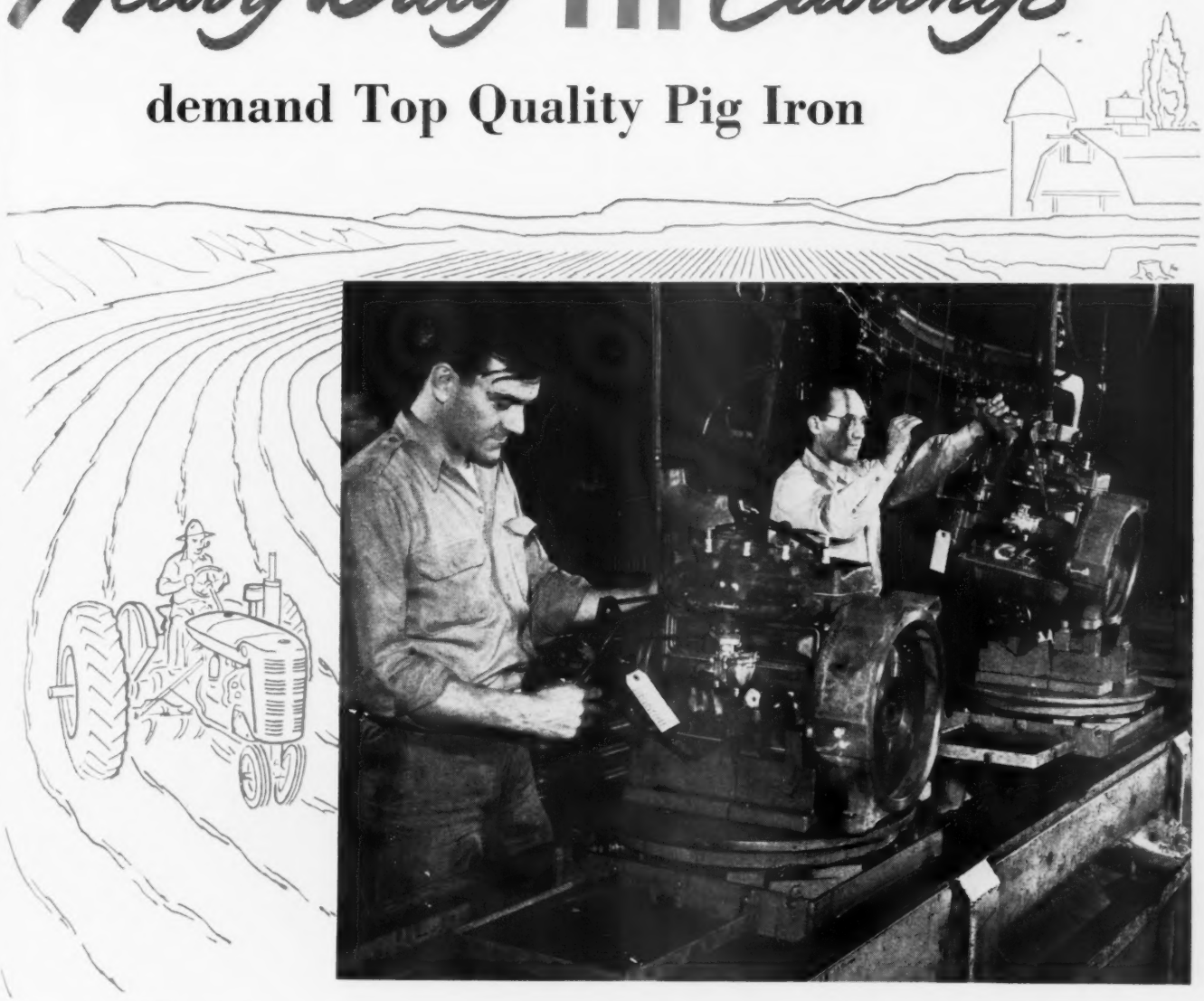
LEE L. EDWARDS
. . . fire brick sales, Texas

ED C. MILLER
. . . Indianapolis sales mgr.

EARL WHITE
. . . heads Corn Belt Chapter

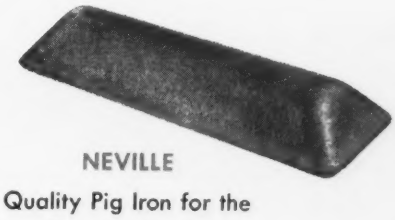
Heavy Duty IH Castings

demand Top Quality Pig Iron



TRACTOR engines have to be tough to withstand the constant heavy duty service that's part of everyday farm use. That's why the International Harvester Company sets rigid quality specifications on the pig iron they use for tractor engine castings and other important cast parts. For many years International Harvester has relied upon the uniform composition and high quality of Neville Pig Iron. ● If you have a problem of maintaining special properties in your castings, chances are we can help you, too. Why not call or write us *today?*

W&D 4922



NEVILLE
Quality Pig Iron for the
Foundry Trade

PIG IRON DIVISION
PITTSBURGH
COKE & CHEMICAL CO.
Grant Building • Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

(*Continued from page* 138)

tirement last year as foundry superintendent at Paxton-Mitchell Co., he joined M. A. Bell Co. He was one of the organizers of the Corn Belt Chapter and served as its chairman last year.

♦ ♦ ♦

R. G. Thibaut has been appointed service manager, Thew Shovel Co., Lorain, O., succeeding the late R. P. Kelly. Mr. Thibaut, who joined the company in 1936, will have charge of international servicing of the company's machines. **C. W. Raby** has succeeded Mr. Thibaut as assistant service manager. Mr. Raby, who has been with Thew 26 years previously served as traffic manager and manager of field service

♦ ♦ ♦

William O. Lifton has been appointed Chicago district manager, Arcos Corp., Philadelphia, maker of low hydrogen and stainless welding electrodes.

♦ ♦ ♦

Thomas D. Nast has been named president, All-State Welding Alloys Co., New York, succeeding **Bent Laune** resigned. Mr. Nast has been a director and secretary-treasurer since the company was founded in 1946.

♦ ♦ ♦

Hubert Chappie, chairman of the Southern California Chapter of the American Foundrymen's Society for 1953-54, since 1948 has been foundry superintendent for National Supply Co., in Torrance, Calif. Mr. Chappie spent 22 years with George H. Smith Steel Casting Co., Milwaukee, where he became foundry superintendent. Later he was associated with Lebanon Steel Foundry, Lebanon, Pa., National Malleable & Steel Castings Co., Melrose Park, Ill., Texas Electric Steel Casting Co., Houston, Tex., and Columbia Steel Casting Co., Torrance, Calif. Mr. Chappie was vice chairman of the Southern California Chapter last year and in 1950-51 served as chairman of the Technical and Operating Group, Southern California West Coast chapter of the Steel Founders' Society of America.

♦ ♦ ♦

Emil Wachtel, of E. Wachtel Co., San Francisco, industrial design and production consultant, has been appointed northern California representative, Precision Castparts Corp., Portland, Oreg. Mr. Wachtel was formerly business and sales manager for Allied Engineering & Mfg. Co., Redwood City, Calif.

EMIL WACHTEL
. . . Precision Castparts sales

♦ ♦ ♦

George E. Dalbey, metallurgist, U. S. Navy Yard, Mare Island, Calif., has retired. Mr. Dalbey was graduated from Kansas City University and was previously associated with American Smelting & Refining Co., Omaha, Neb., Eastern Brass & Ingot Co., Waterbury, Conn., University of California, and S. L. Abbott Chemical Co., San Francisco. He is a former director of the Northern California Chapter of the American Foundrymen's Society.

♦ ♦ ♦

S. V. V. Hoffman has been appointed district manager of west coast sales, Raybestos-Manhattan Inc., Passaic, N. J., with headquarters in Los Angeles. Mr. Hoffman joined the company in 1939 and served in the New York and San Francisco sales offices until 1951 when he became regional manager in Los Angeles.

♦ ♦ ♦

R. L. Jones, assistant works manager, American Steel Foundries, East St. Louis, Ill., has been named works manager of its Indiana Harbor Works in East Chicago, Ind. Mr. Jones joined the company following graduation from Purdue University in 1937 and has been in the East St. Louis plant since 1941.

♦ ♦ ♦

Elmer J. Lell, assistant sales manager, Wall Colmonoy Corp., Detroit, has been named sales manager. Mr. Lell, who attended University of California in Los Angeles, joined the company in 1948 and was branch manager in Houston, Tex., until 1951 when he returned to the Detroit office.

♦ ♦ ♦

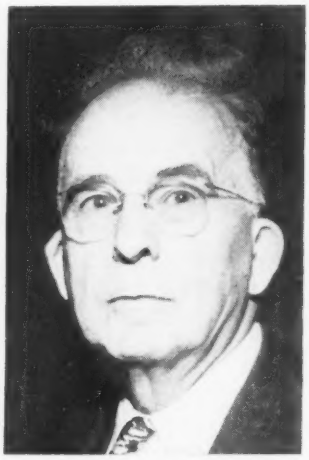
Col. Willard F. Rockwell, chairman of the boards of directors, Rockwell Mfg. Co., Pittsburgh, and Rockwell Spring & Axle Co., Coraopolis, Pa., was recently re-elected for a year's term to the National Industrial Conference Board.

♦ ♦ ♦

Peyton L. Morgan Jr. has been appointed southern district engineer for the Air Appliance Division, U. S. Hoffman Machinery Corp., New York, in the area including Virginia, West

(*Concluded on page* 142)

HUBERT CHAPPIE
. . . AFS Chapter Chairman



GEORGE E. DALBEY
. . . leaves Navy Yard

PEYTON L. MORGAN JR.
. . . Hoffman Machinery sales

THEY TRIED A SMALL *Thermex* UNIT

...proved the value of Thermex Electronic Baking

...THEN BOUGHT TWO BIG *Thermex* UNITS

Modernization cuts core room manhours 33%

"THE PROOF OF THE PUDDING" is in the heating at James B. Clow & Sons, Coshocton, Ohio. To prove the superior speed and quality of electronic core baking for pipe fittings, this progressive foundry installed a 15 KW Thermex unit three years ago. The results led them to modernize the core room and to make the mainstay of this streamlined operation two 60 KW Thermex Core Baking Units. This renovation has enabled Clow to reduce the core room crew from 24 to 16 . . . saving 8 men for other departments.

S. C. Clow, Chief Metallurgist, cites these advantages of core baking with the Thermex equipment:

1 Improves dimensional stability. Minimizes the sagging of cores.

2 Saves manhours. Cuts handling of cores and plates. Eliminates rod reinforcing of cores.

3 Reduces core loss due to breakage in pouring and handling.

4 Speeds up turnover of core plates. Fewer plates needed and being of plywood, they are cheaper.

5 Can produce cores in special runs quickly. Highly flexible.

6 Baking is versatile. Used for cores as small as 2 ounces . . . as large as 400 pounds.

Find out how *you* can cut costs and improve cores with Thermex equipment. Write for free booklet. The Girdler Company, Thermex Division, Louisville 1, Ky.

*THERMEX—Trade Mark Reg. U. S. Pat. Off

the GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

THERMEX DIVISION

(*Concluded from page* 140)

Virginia, Ohio, Kentucky, Indiana, Tennessee, Georgia, North and South Carolina, Alabama and Florida. Mr. Morgan was graduated from Virginia Polytechnic Institute and since 1948 has been associated with the Hoffman Company representative in Lynchburg, Va.

♦ ♦ ♦

Benjamin E. Weimer, recently elected chairman of the Cleveland Chapter of the Non-Ferrous Founders' Society for 1953-54, is director of the purchasing department, Wellman Bronze & Aluminum Co., Cleveland. Mr. Weimer became associated with the company in 1941 as an expediter and the following year took charge of production scheduling. Early in 1952 he became director of customer relations and last October was named purchasing agent. Mr. Weimer was secretary of the Cleveland chapter last year.

BENJAMIN E. WEIMER
. . . heads NFS chapter

♦ ♦ ♦

Howard A. Acheson was recently re-elected president and chairman of the board, Acheson Industries Inc., New York, and its affiliates. **Raymond Szymanowitz, P. C. Buck** and **M. W. Reynolds** were named vice presidents. **John C. Sprague** was made secretary - treasurer. **Mrs. Leatha Tuer,** assistant secretary, and **Lester H. Miller,** assistant treasurer.

♦ ♦ ♦

Frank W. Jenks, vice president, International Harvester Co., Chicago, has been elected a director, American Steel Foundries, there. **Joseph B. Lanterman,** controller of American Steel Foundries, has also been elected vice president.

♦ ♦ ♦

Arthur S. Klopf has joined Sessions Engineering Co., Chicago, as vice president. Mr. Klopf recently returned from San Francisco where he was West Coast sales manager for Great Lakes Carbon Co., Niagara Falls, N. Y.

♦ ♦ ♦

Fred E. Fishman has joined Sipi Metals Corp., Chicago, as representative in Indianapolis for the company's line of specialty alloys. Mr. Fishman has been associated with the nonferrous industry for over 25 years.

♦ ♦ ♦

John L. MacDonald, formerly Boston district industrial tool service engineer, Thor Power Tool Co., Aurora, Ill., has been named manager of the Newark, N. J., office recently opened there by the company. Mr. MacDonald has been with the company since 1947.

JOHN L. MacDONALD
. . . Thor sales, Newark

♦ ♦ ♦

V. A. Guebard Jr. has been appointed general superintendent of the gray iron foundry, International Harvester Co., Milwaukee, succeeding **Elijah Rice,** who has retired. **Frank Yearling,** formerly assistant general superintendent of the Chicago Tractor Works foundry, has succeeded Mr. Guebard as assistant general superintendent in the Milwaukee gray iron foundry.

♦ ♦ ♦

Harry Carlson, previously manager of the laminating materials division, Bakelite Co., division of Union Carbide & Carbon Corp., New York, has been transferred to the market development department.

♦ ♦ ♦

Harold J. Roast, bronze foundry consultant, has established headquarters at 140 Grosvenor Ave., Ottawa 1, Ont., Canada.

♦ ♦ ♦

William L. Oberhelman, elected chairman of the Cincinnati District Chapter of the American Foundrymen's Society for 1953-54, is secretary and superintendent, Oberhelman-Ritter Foundry Co., Cincinnati. Mr. Oberhelman joined the company in 1941. He served as secretary of the Cincinnati District Chapter in 1951 and as vice chairman last year.

♦ ♦ ♦

G. Clymer Brooke, formerly vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has been elected executive vice president.

♦ ♦ ♦

William R. Ellenberger has been appointed sales engineer in charge of sand reclamation installations in the foundry industry for Nichols Engineering & Research Corp., New York. A graduate of University of Illinois, Mr. Ellenberger was formerly in the manufacturing research section, foundry division, International Harvester Co., Chicago.

WILLIAM R. ELLENBERGER
. . . joins Nichols Engineering

♦ ♦ ♦

George W. Myers has been named president, Crucible Steel Casting Co., Milwaukee, succeeding **Richard D. Colburn,** who continues as a director of the Misco Corp., Chicago, the parent company. Mr. Myers was previously works manager of the Indiana Harbor Works, American Steel Foundries, East Chicago, Ind. He began his career as an apprentice at Falk Corp., Milwaukee.

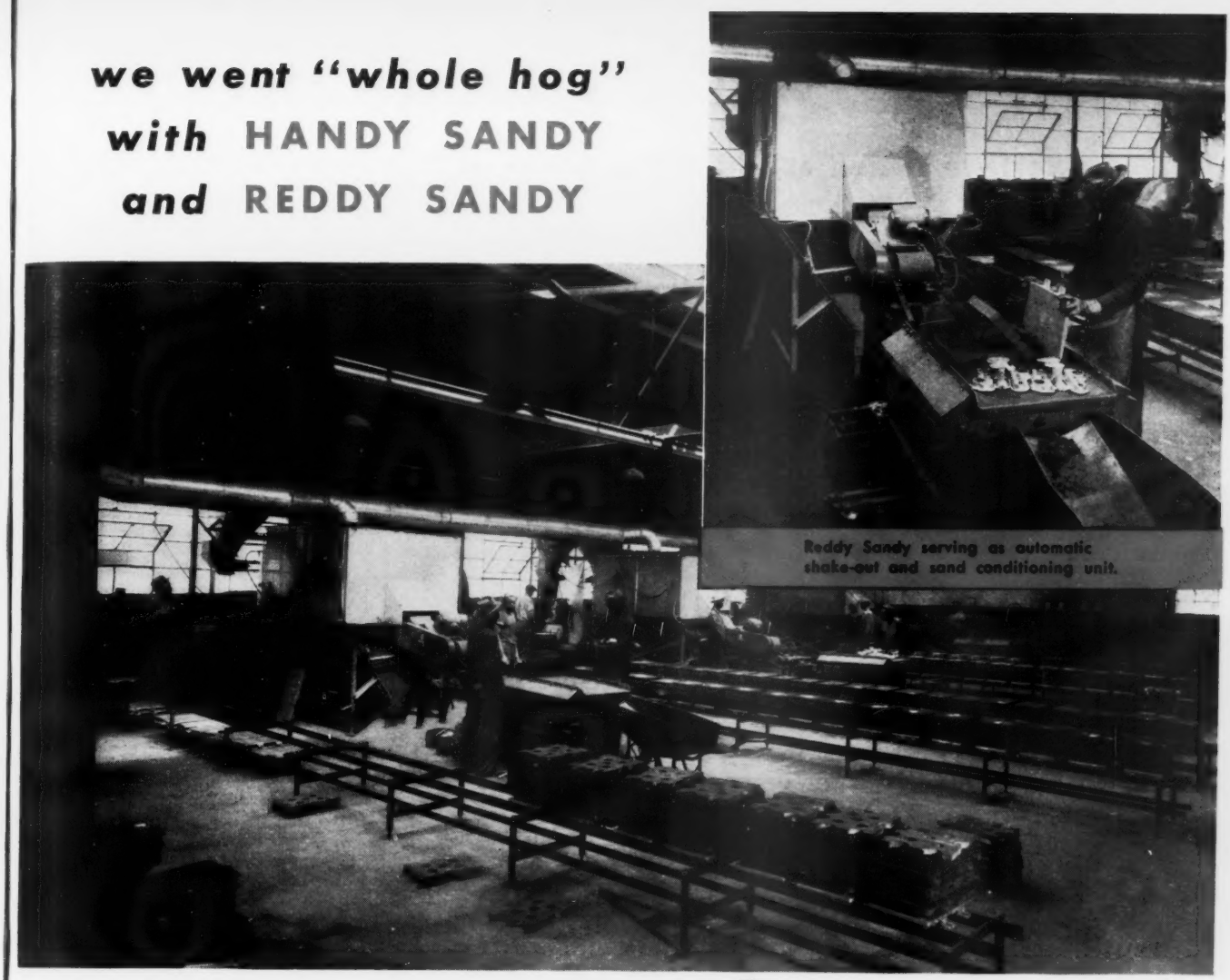
♦ ♦ ♦

K. J. Kettner has been named northeastern Ohio district manager, Ramtite Co. division of S. Obermayer Co., Chicago. Mr. Kettner has been with the refractories company since 1946.

♦ ♦ ♦

Irwin Goodman, in charge of regional scrap purchases, Sipi Metals Corp., Chicago, has been named assistant treasurer. He joined the company 25 years ago.

we went "whole hog" with HANDY SANDY and REDDY SANDY



Reddy Sandy serving as automatic shake-out and sand conditioning unit.

Showing how 3 Handy Sandys and Reddy Sandys have simplified molding and set-out operations.

...and it paid off

"When our foundry was improved recently, we did not stop at halfway measures," states Mr. Elmer E. Lundquist of the Lake City Foundry Co., Chicago, Illinois. "Newaygo equipment looked so good to us that we decided to take full advantage of the obvious time, labor and cost saving features.

"Previous to remodeling, our molding machines were on one side of the shop and the bench molders on the other, with two sets of overhead cranes running the length of the shop. Pouring crucibles were picked up by either right or left hand cranes and brought to the molds. Now, all three Handy Sandy's and Reddy Sandy's as well as the bench molders are on one side of the shop, and one 'overall' crane takes the metal to any place in the foundry without any transfer procedure.

"The molders no longer have to carry each complete squeezer mold to its pouring location. Now, he simply turns around and places the mold on the rails and rolls it down the length of the set-out. Naturally, the molders are very pleased with the new sand handling arrangement. They expend less energy per mold and without carrying molds down to pouring locations, they have increased their output at least 20% over previous methods."

The Lake City Foundry Co., Inc. was founded in 1920 by Karl Lundquist, a foundryman since the age of 12. The original foundry, producing mainly jobbing and intricate pattern castings, grew under his capable guidance. In 1930 he was joined by his son Arnold and in 1942 when Karl retired, another son, Elmer, joined the foundry.

In 1946 the present modern plant at 2324 West Fulton Street was put into operation for the volume production of aluminum, bronze and copper castings. The Lundquists have always maintained high quality castings with each job getting their personal attention.

Mr. E. Long is the Plant Superintendent and Mr. R. Peterson is the Foundry Engineer.

A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone today.

NEWAYGO engineering company
NEWAYGO, MICHIGAN
Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

FEMA HOLDS 35th ANNUAL MEETING

Reviews Activities, Business Trends and Elects Officers

By FRANK G. STEINEBACH
Editor

FOUNDRY Equipment Manufacturers' Association, at its 35th annual meeting held at the Greenbrier, White Sulphur Springs, W. Va., Oct. 15-17, reviewed the activities of the association, considered general business trends in the industry and elected officers.

W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, was elected president of the association, succeeding Claude B. Schneible, president, Claude B. Schneible Co., Detroit. D. E. Davidson, vice president for sales, Link-Belt Co., Chicago, was elected vice president, succeeding Mr. Wallis, and Arthur J. Tuscany Jr. was elected executive secretary-treasurer, succeeding the late Arthur J. Tuscany, who served FEMA in that capacity for 18 years.

W. B. WALLIS
President

D. E. DAVIDSON
Vice President

ARTHUR J. TUSCANY JR.
Executive Secretary-Treasurer

New members elected to the board of directors are as follows: W. G. Frank, executive vice president, American Air Filter Co., Louisville, Ky., and Russell J. Hines, vice president and general manager, Hines Flask Co., Cleveland, and Odd H. McCleary, vice president and general manager, Mathews Conveyer Co., Ellwood City, Pa.

The first day of the annual meeting was devoted to meetings of the following product groups of the association: Molding machines, dust and fume control, flasks, blast cleaning and tumbling, furnaces and accessories, and material handling and processing.

The Washington situation, as it affects foundry equipment was discussed at the opening session by Chester V. Nass, Beardsley & Piper Co., Chicago, and Thomas Kaveny Jr., Herman Pneumatic Machine Co., Pittsburgh, with Mr. Schneible presiding. Mr. Nass outlined the setup of the new Business and Defense Services Administration under the Department of Commerce, and indicated that the metalworking division will handle the problems of foundry equipment. He expressed the belief that the industry advisory committees will be continued under BDSA.

Mr. Nass suggested that the industry offer its services in connection with the storage of government-owned equipment. Mr. Kaveny stressed the point that as long as the government maintains an agency in Washington to handle business problems, the foundry equipment industry through FEMA should continue to maintain a contact.

E. A. Borch, National Metal Abrasives Co., Cleveland, in an interpretation of FEMA statistical reports, outlined an improvement in the mechanics of handling statistics which has been placed in operation. He also stressed the value that may arrive through a greater number of companies participating in the statistical reports.

In discussing the future trends of the industry, Mr. Borch stated that the need for expansion of foundry capacity has lessened, at least for the time being. The main emphasis will be found in plans for modernization and replacing of obsolete equipment. Acquainting foundrymen with the developments in new equipment, and selling the idea of replacing obsolete equipment with the latest cost-reducing machines is the job of the foundry equipment industry.

A. A. Hilbron, American Foundrymen's Society, Chicago, discussed plans for the 1954 annual foundry convention and show which will open in Cleveland's Public Auditorium on May 8. Frank J. Dost, Sterling Foundry Co., Wellington, O., and vice president, AFS, outlined the educational activities of the society, and told of plans for the new headquarters building.

Mr. Kaveny and Mr. Schneible reported on progress of the Foundry Educational Foundation and urged continued support of the foundry and allied industries in the work. Mr. Schneible also reported on the work of the National Castings Council in developing greater recognition for the foundry industry in Washington.

Mr. Wallis and Mr. Schneible reported on the International Foundry Congress held in Paris in September. C. E. Seavoy, Whiting Corp., Harvey, Ill., also told of some of his experiences on the AFS-sponsored tour in Europe last summer.

It was announced that the 1954 annual meeting of FEMA will be held at the Greenbrier, Oct. 14 to 16.

Season's Greetings
to all the foundries
that had great success
with

SMITH
L-O
CORE OIL

during 1953
N.B. that's your cue to enjoy
equally fine results in your
foundry in 1954...
and from then on

SMITH REPRESENTATIVES

- COLUMBIAN WAREHOUSE CO. — Reading, Pennsylvania
- ELTEX CHEMICAL COMPANY — Houston 2, Texas
- FOUNDRIES MATERIALS CO. — Coldwater, Michigan
- FOUNDRY SERVICE CO. — Birmingham, Alabama
- F. F. SHORTSLEEVE — Elmira, New York
- MALCOLM G. STEVENS — Arlington, Massachusetts
- PACIFIC GRAPHITE CO., INC. — Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. — St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. — Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. — Portland 14, Oregon
- THOMAS H. GREGG CO. — Milwaukee 9, Wisconsin

Smith L-O Core Oil

ROD DIP LIQUID PARTING

SMITH OIL & REFINING CO.

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

Ohio Ferro-Alloy Products

Ferro-Alloys

- FERRO - SILICON 25 - 50 65 - 75 - 85 - 90%
- SPECIAL BLOCKING 50% FERRO - SILICON
- SILICON METAL
- FERRO - MANGANESE
- HIGH CARBON FERRO-CHROME
- LOW CARBON FERRO-CHROME SILICON
- BOROSIL
- SIMANAL

Briquets

- SILICON
- MANGANESE
- SILICO - MANGANESE
- CHROME

NEWLY DEVELOPED X-RAY DEVICE

Extends Use of Radiography

FIRST prototype unit of a new x-ray development, Xeroradiography, is being tested by Aluminum Co. of America at its Cleveland Research Division. Alcoa is co-operating with General Electric's x-ray department and with Haloid Co. in field evaluation of the unit, which will involve its use in the inspection of castings.

Xeroradiography (pronounced "zero radiography") is an advanced technique in x-ray. It employs a reusable dry plate to record the x-ray image, and static electricity. The static electricity arranges a fine-grain powder on a specially coated aluminum plate and produces an image similar to that on an x-ray film.

Developed by General Electric and Haloid in co-operation with Battelle Memorial Institute, the new technique is said to hold great promise for extending the use of radiography. With the new process an x-ray image is available for viewing within 45 seconds.

The technique involves use of the reusable plate with the conventional x-ray tube; no new x-ray equipment

Setting up to x-ray an aircraft cylinder head of cast aluminum

is required and the need for a dark room to prepare the image is eliminated. A permanent record of the image on the plate, if it is desired, can be made in a few seconds by photographic methods.

What promises to be a significant aspect of Xeroradiography is its speed, which should open the use of x-ray to many new metalworking firms and broaden its use in those now employing standard radiographic procedures. Those involved in its development think it will be an additional tool, offering savings not only in time but in labor, space and materials. Regular continuous production line inspection in the foundry industry may be an eventual result.

The new process will be evaluated and tested by Alcoa and others in industry and other fields, using such evaluative devices as dual reading, involving direct comparison of results with existing x-ray methods.

Basic Materials Show Set

The second Basic Materials Exposition and Conference will be held at International Amphitheatre, Chicago, May 17-20. The first show last June proved very successful. The exposition was founded and is produced by Clapp & Poliak Inc., New York. Exhibits are limited to companies producing basic materials used in making other products. Manufacturers of end products and equipment producers may attend only as visitors.

Meetings of Interest to Foundrymen

Dec. 3-5—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Netherland-Plaza Hotel, Cincinnati

1954

Jan. 22—Malleable Founders' Society, general society meeting, Hotel Cleveland, Cleveland

Jan. 25-28—Plant Maintenance & Engineering Show, International Amphitheater, Chicago. The **Plant Maintenance & Engineering Conference** will be held concurrently at the Hotel Conrad Hilton, Chicago

Feb. 1-5—American Society for Testing Materials, committee week, Hotel Shoreham, Washington, D. C.

Feb. 11-12—Wisconsin Regional Foundry Conference, Schroeder Hotel, Milwaukee

Feb. 18-19—Southeastern Regional Foundry Conference, Patten Hotel, Chattanooga, Tenn.

Mar. 10-11—Foundry Educational Foundation, annual conference of advisory committees and annual meeting, Hotel Cleveland, Cleveland

Mar. 15-19—National Association of Corrosion Engineers, tenth annual conference and exhibition, Kansas City

Mar. 16-17—Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

Apr. 5-7—American Institute of Mining & Metallurgical Engineers, national open hearth conference, Palmer House, Chicago

Apr. 8-9—Malleable Founders' Society, market development conference, Carnegie Institute of Technology, Pittsburgh

May 4-7—American Welding Society, national spring technical meeting, Hotel Statler, Buffalo

May 5-7—American Society of Training Directors, annual conference, Hotel Schroeder, Milwaukee

May 5-8—American Welding Society, welding and allied industry exposition, Buffalo Memorial Auditorium, Buffalo

May 8-14—American Foundrymen's Society, annual convention and exhibition, Public Auditorium, Cleveland

May 17-20—Basic Materials Exposition, International Amphitheater, Chicago

June 14-15—Malleable Founders' Society, annual meeting, Seigniory Club, Province of Quebec, Canada

June 14-18—American Society for Testing Materials, annual meeting, Hotels Sherman and Morrison, Chicago

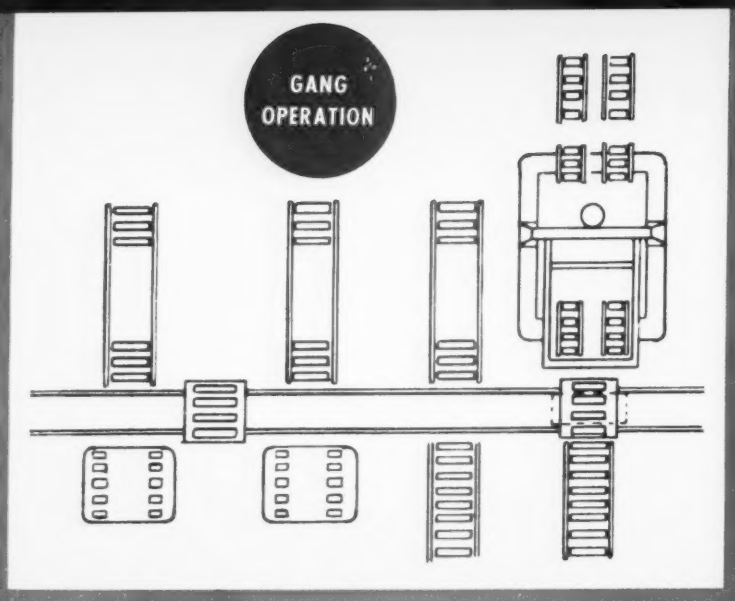
Sept. 27-28—Steel Founders' Society of America, fall meeting, the Greenbrier, White Sulphur Springs, W. Va.

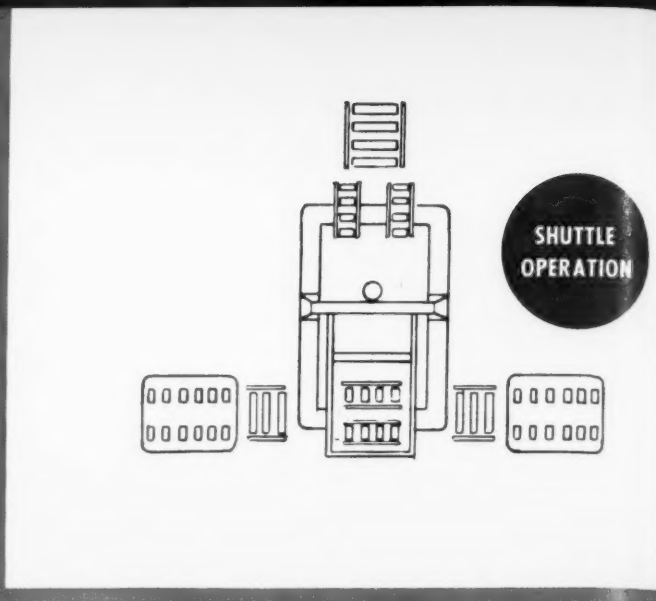
Oct. 6-8—National Foundry Association, 56th annual meeting, Hotel Sheraton, Chicago

Oct. 14-16—Foundry Equipment Manufacturers' Association, annual meeting, the Greenbrier, White Sul- Springs, W. Va.

Nov. 1-5—American Society for Metals, National Metal Congress and Exposition, International Amphitheater, Chicago

Nov. 11-12—Gray Iron Founders' Society, annual meeting, the Homestead, Hot Springs, Va.

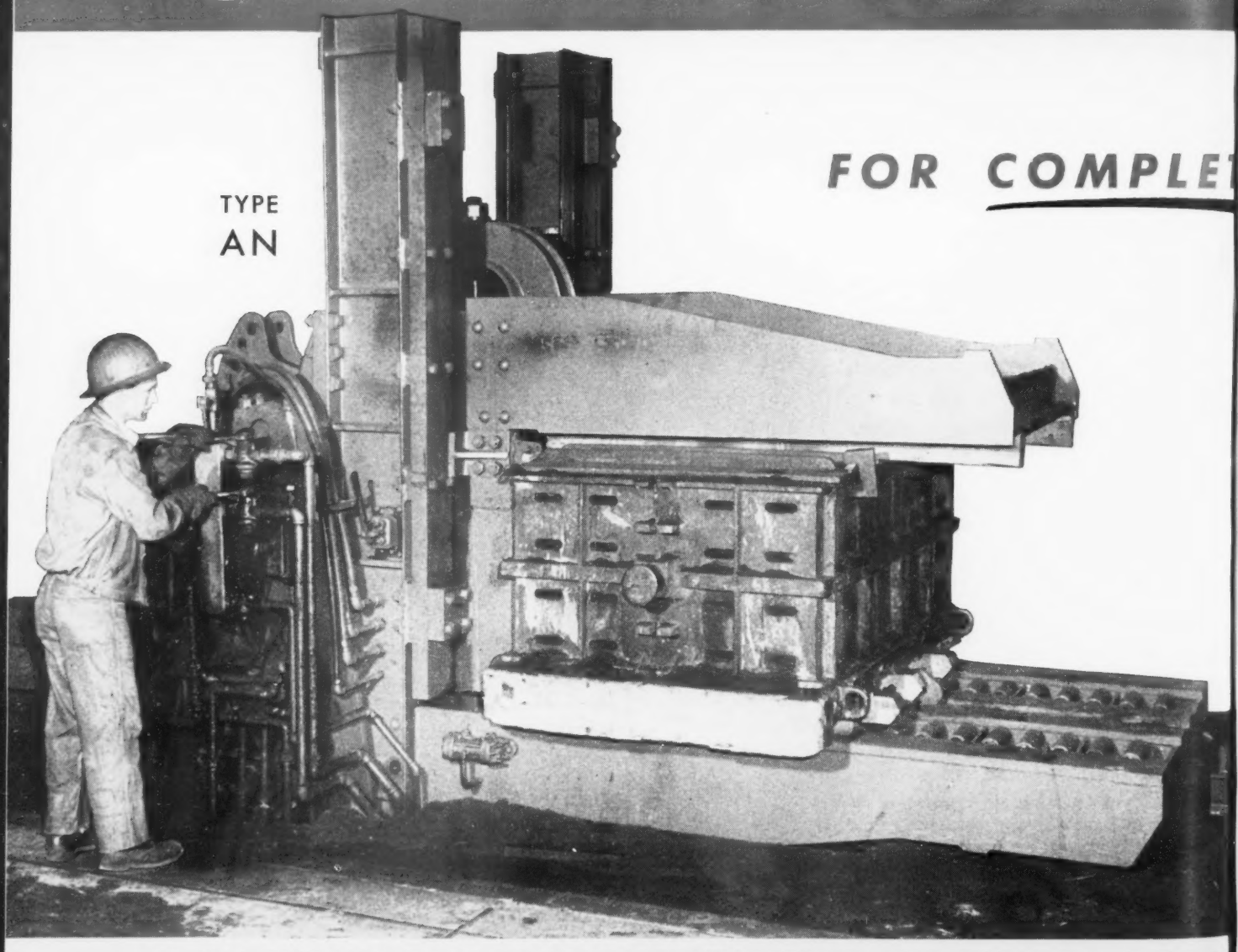




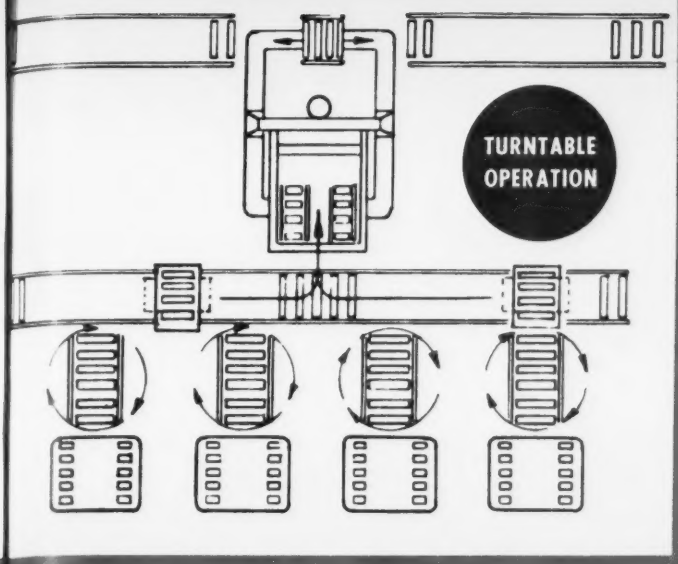
UNLIMITED ROLL

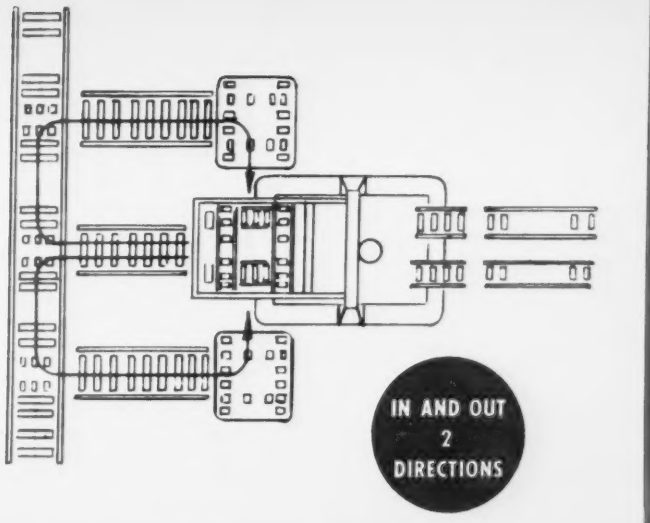
FOR COMPLE

TYPE
AN



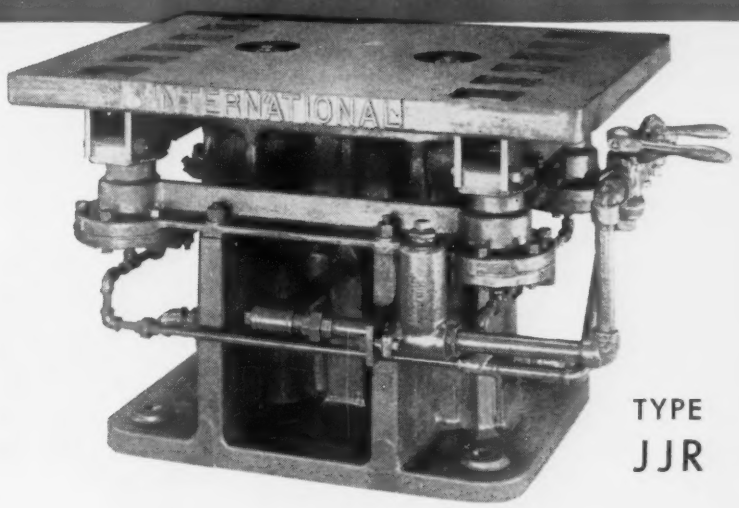
INTERNATIONAL MO





L COMBINATIONS

Versatility
Flexibility
Adaptability



TYPE
JJR

. . . IN ANY SHOP . . . FOR ANY NEED!

The roller layouts shown above are just a few of the many roller combinations possible with the International Line of AN and JJR Machines.

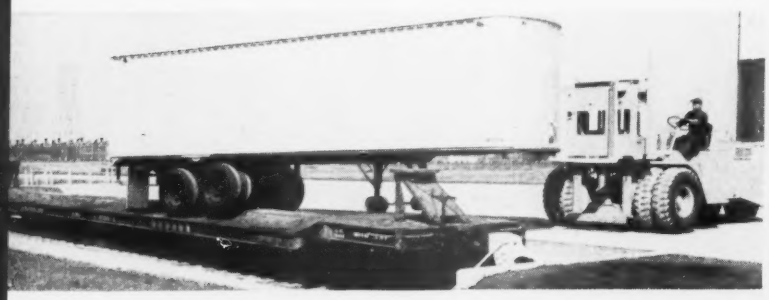
"There is an INTERNATIONAL for Every Type of Job"

The International Line is designed, built, and sold by experienced Foundry Engineers who have a practical working knowledge of the problems of the industry.

ING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

News Views



POSITIONING "PIGGYBACK" TRAILERS: This modified 26,000-lb Ross fork lift truck, manufactured by Clark Equipment Co., Battle Creek, Mich., is equipped with an attachment that enables it to position a highway trailer 35 ft long on a railroad flatcar in just a few minutes

HELPING THE HANDICAPPED: President Eisenhower's Committee on National Employment of the Physically Handicapped recently gave an award to Cooper-Bessemer Corp., Mount Vernon, O., for its record in providing jobs for the disabled. President Gordon Lefebvre received the award from Miss Rose Michaux, who is the manager of the Mount Vernon office of the Ohio State Employment Service

AWARD WINNER: Award of merit for public relations communications is presented to J. P. Stewart, president, De Laval Steam Turbine Co., Trenton, N. J., by Henry W. Johnson, president, New Jersey Manufacturers Association, in conjunction with a radio series saluting De Laval

HONOR LONG SERVICE: Over 700 employees of Mexico Refractories Co., Mexico, Mo., joined in a celebration at which service pins were presented to employees with 5, 10, 15 or 20 years of service. The plant was closed for an afternoon so that the ceremony could take place. View above shows some of the workers with the longest service

A GOOD process made still BETTER

a BETTER Cupola Gun and a BETTER Cupoline

Do you want faster, more lasting and therefore cheaper cupola patching? You can get it in the Bondact process. The Bondact process equals the Cupoline refractory plus the Bondact gun. Both parts have been improved — the entire "package".

Thanks to our advancing methods, a new *Cupoline* now brings you a still more effective composition and greater uniformity. Results: increased flowability, minimum rebound and negligible burn-out.

Bondactor as redesigned has: (1) a new, exclusive air recovery system to reduce air consumption per pound of refractory, (2) a larger, more powerful air motor, (3) an improved rate of flow control, (4) a heavier, more positive material valve assembly, and (5) minimum maintenance.

ONLY ECP CAN PROVIDE THE COMPLETE PACKAGE
the equipment AND *the refractory*
BONDACTOR CUPOLINE

Write for OUR ATTRACTIVE PRICES ON REBUILDING YOUR PRESENT BONDACTOR TO MODEL 1250 EFFICIENCY

International MINERALS & CHEMICALS

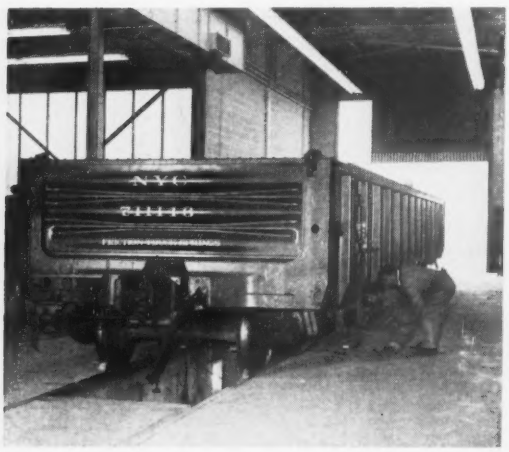
EASTERN CLAY PRODUCTS *Department*

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

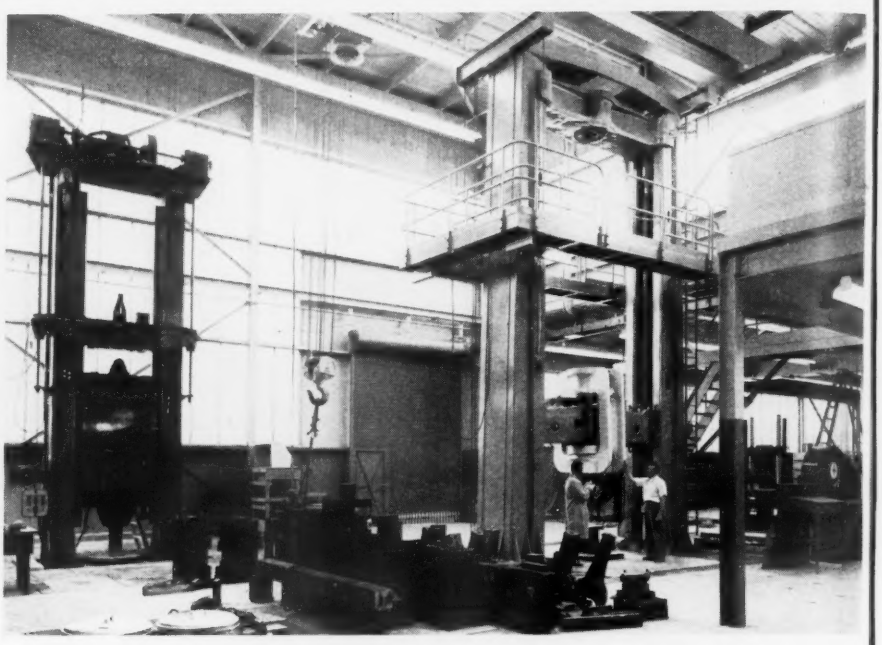
General Offices: 20 North Wacker Drive, Chicago 6

DIXIE BOND • BLACK HILLS BENTONITE • TRIPLACT • REVIVO CORE PASTE • REVIVO BOND • BONDACTOR • CUPOLINE • DURA PRODUCTS • WESTONITE

Over-all view of the new Technical Center. Proving ground tracks are located at far left



Inspection pit where the testing of component parts of railroad and mine cars is conducted



Two of the major testing units. At left is drop test machine used principally to test draft gears. Million-pound universal machine is at right

National Malleable Opens

NEW TECHNICAL CENTER

NATIONAL Malleable & Steel Castings Co. recently completed in Cleveland a new Technical Center for the conduct of engineering and research in its cast products. While much of the equipment installed in the new facility is unique, the center's real distinction is in the range and completeness of its facilities. From this standpoint, it is said to be without an equal in the world.

The center is composed of four coordinated sections: An extensive physical testing laboratory with a wide range of equipment, including electronic measuring and recording devices; the company's engineering department; a proving ground, including test tracks, railroad car pits and National's privately owned, specially equipped railroad and mine cars; administrative quarters and meeting rooms.

The building itself incorporates the most modern developments in illumination, sound control, air conditioning, and decorative motif. Occupying an area of 5.7 acres, the structure has 36,850 sq ft of floor area.

Major testing equipment includes a universal testing machine with 1 million lb capacity, a 120,000-lb machine for testing smaller specimens, a drop test machine employing a 27,000-lb weight, a dynamic fatigue test machine, a coupler angling and anticreep machine, and a 600,000-lb capacity press. Numerous miscellaneous testing devices also are provided.

The proving ground includes a test track used for conducting impact tests on standard freight and passenger cars. The track has a third rail for testing narrow gage mine car equipment. Impacting cars are pulled up the incline with a power winch to a height which will produce the desired speed. An automatic device, fastened to a puller car, releases the impacting car, allowing it to roll into the standing car, which is equipped with the devices to be tested. A maximum impact speed of 22 mph can be attained.

These new facilities are part of a $12 million program of improvement and expansion by National Malleable, which recently marked its 85th anniversary. Established in Cleveland in 1868, the company since then has sold more than $1 billion worth of products, met payrolls totaling $480 million, purchased $500 million of materials and supplies, earned profits of $73 million, paid $26 million in dividends and put $47 million back into the business. The company now operates foundries in five states and employs about 5750 workers.

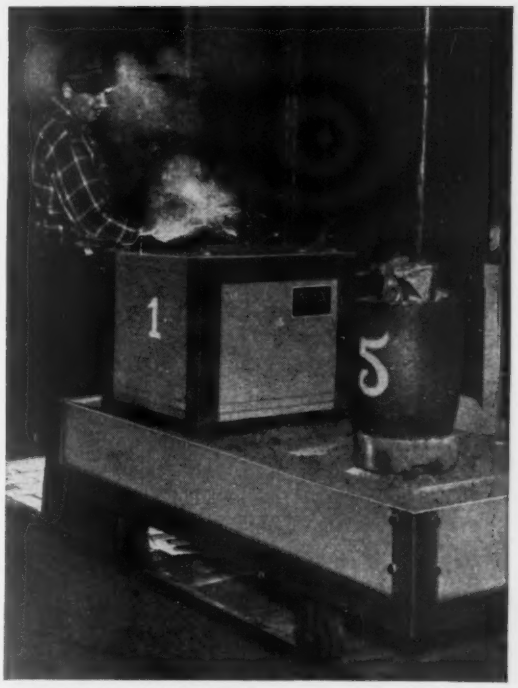
THE MOST *Economical* WAY TO MELT *Quality Bronze*

AJAX-NORTHRUP INDUCTION FURNACES

An Ajax-Northrup equipped bronze foundry, melting a wide variety of alloys in lift-coil furnaces, reports 10% higher tensile strength for certain of its induction-melted alloys... and has reduced melting costs by over $33.00 a ton at the same time!

Similar performance is reported by users of the larger tilting furnaces. The tilting units are slightly more efficient than the lift-coil equipment, and are used where ability to switch alloys frequently is less important.

If you haven't looked into the possibilities of induction melting for your non-ferrous foundry lately, we'd like to show you some of the data we've gathered from recent installations. Just write or phone us.



LIFT-COIL FURNACES *can melt different alloys simply by switching crucibles.*

TILTING FURNACES *are used for larger quantities, or special production runs.*

AJAX NORTHRUP

INDUCTION HEATING AND MELTING

AJAX ELECTROTHERMIC CORPORATION
Ajax Park, Trenton 5, New Jersey

Associated Companies

AJAX ELECTROMETALLURGICAL CORP.
AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

Since 1916

Pushbutton Foundry is approached in Automatic Molding System

By ROBERT H. HERRMANN
Associate Editor

A COMPLETELY automatic cope and drag molding system placed in operation during May, 1952 at the malleable iron foundry of Crane Co., Chicago, is producing 1800 completed green sand molds every 8 hours. It requires the attention of four men—one to set cores, another to remove core setting fixtures, the third and fourth to supervise and control the push-button-operated units. In addition, there is one man pouring, one man at the shakeout and one or two men on relief.

Sand mix used in the machine, as well as for the balance of the foundry, consists of 1800-lb of a three-screen synthetic sand with additions of 5 lb fireclay, 2 lb seacoal, ½-lb cereal flour and 5 per cent moisture. It possesses 11 lb green strength, 0.20 deformation, 90 permeability and 70 flowability.

Sand is delivered to the ramming units from any of three mullers by a 36-in. overhead belt from which it is plowed off into two vibrated storage hoppers, one feeding the drag jolt-squeeze-strip ramming unit and the other the cope unit. An internally mounted paddle at one side of each of the bins is depressed when sand in the hopper reaches a predetermined level, and, in doing so, closes a switch to raise the sand plow off the belt pneumatically. As sand level in the bin falls, the action of the paddle lowers the plow into the belt.

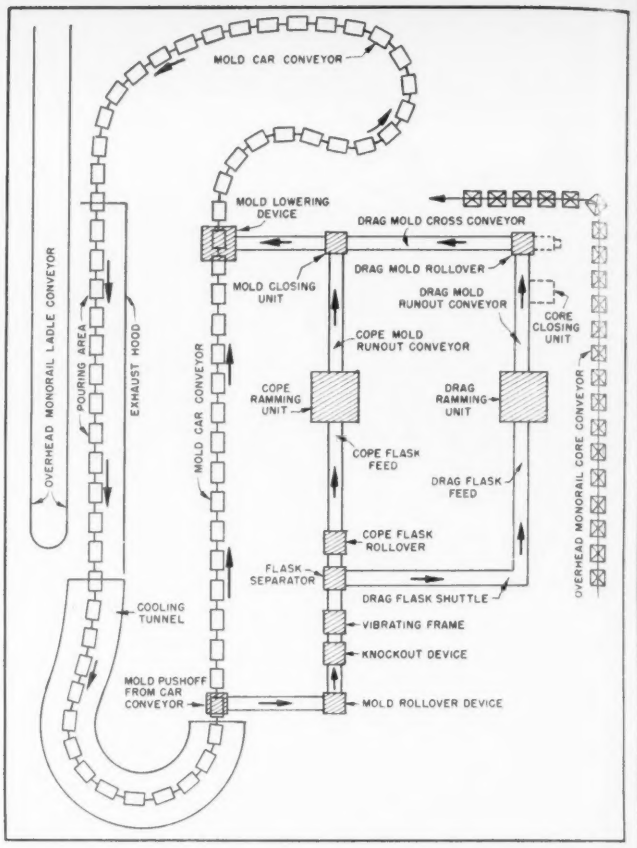
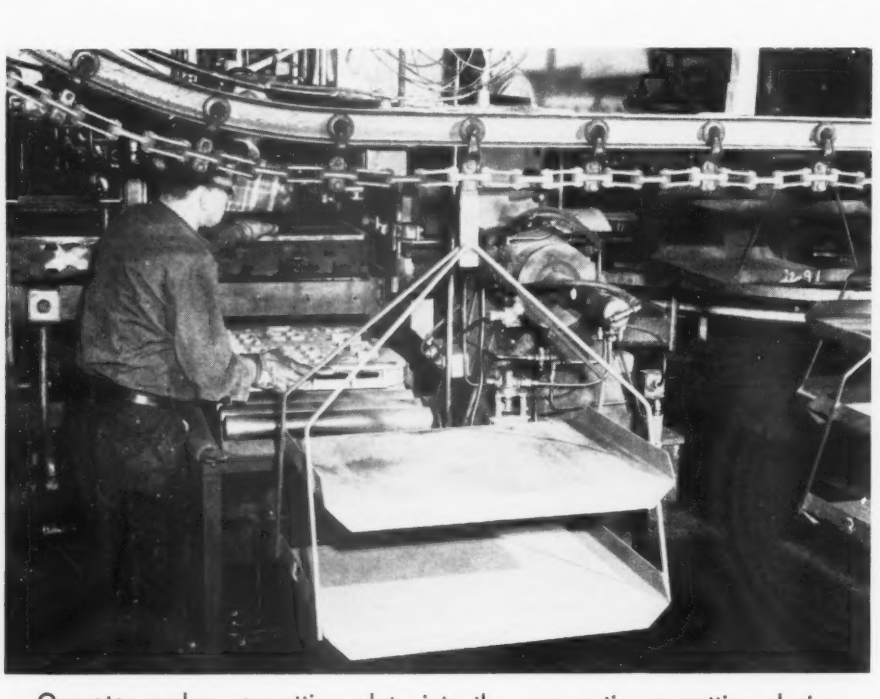


Diagram of the automatic molding system in operation at the Crane Co.'s malleable foundry

The storage hoppers discharge sand through pneumatically-operated gates in the bottom to a 1½-cu-ft capacity adjustable volume metering hopper in an air cylinder-operated shuttle plate on each jolt-squeeze unit. The metering hopper discharges sand through pneumatically operated gates into the 20 x 24 x 6-in. deep flask after it is positioned properly on the pattern plate; hopper is refilled while the mold is being squeezed.

Cope and drag making sections of the system operate identically with the one exception that cores are set only in the drag. Empty flasks are fed to both jolt-squeeze units by gravity on an inclined wheel conveyor. As the flasks roll down the conveyor they are stopped by an air cylinder-actuated arm just before entering the jolt-squeeze units.

Flasks are pulled into position over the pattern by the shuttle, which is equipped with two sets of air cylinder-operated clamps to grasp the



Operator pushes coresetting plate into the pneumatic coresetting device under the drag mold section. Core delivery carrier is shown in foreground

empty flask and the completed mold section. The completed mold section is pushed out of the machine as the empty flask is pulled into position. Then the flask is lowered to the pattern, which is mounted on a pneumatic ram, and sand is discharged into it from the weigh hopper. The flask is jolted and the shuttle moves over ready to pull another empty flask into position.

At conclusion of the jolt the overhead squeezer unit is lowered and the mold squeezed pneumatically at 100 psi line pressure. When the squeezer head retracts, the mold is raised to starting position and the shuttle pushes it out of the machine on a wheel conveyor. As it rolls out, it pushes three completed mold sections ahead of it and passes under a strike-off arm. On the drag line, the fourth half-mold in line then is in position to receive cores.

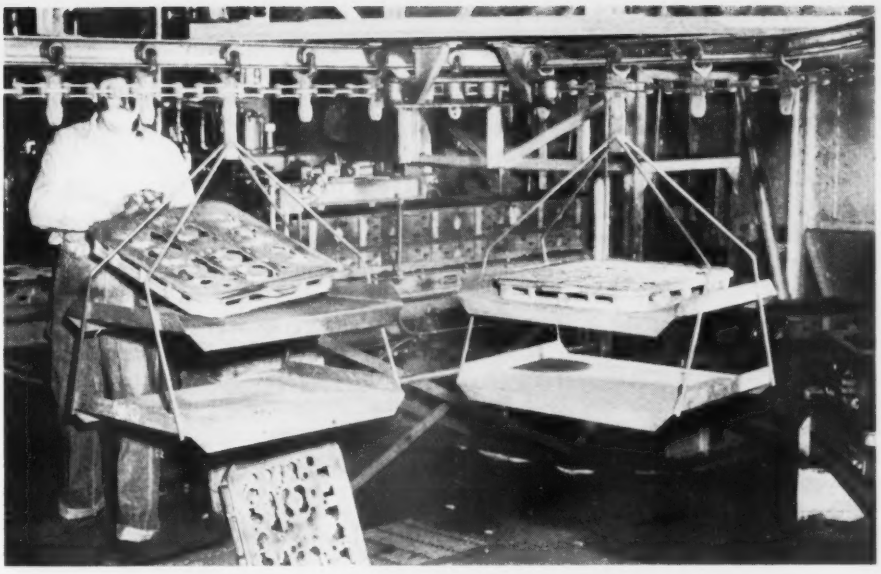
Use Several Conveyors

Cores are delivered from the coreroom on positioning fixtures carried by racks on an overhead monorail chain conveyor. The conveyor dips down from ceiling height, placing the core fixture plate at waist level. A worker removes the plate to a roller conveyor and pushes it onto a pneumatic core-setting device directly under the drag mold section. The plate containing the cores then is raised into the drag automatically.

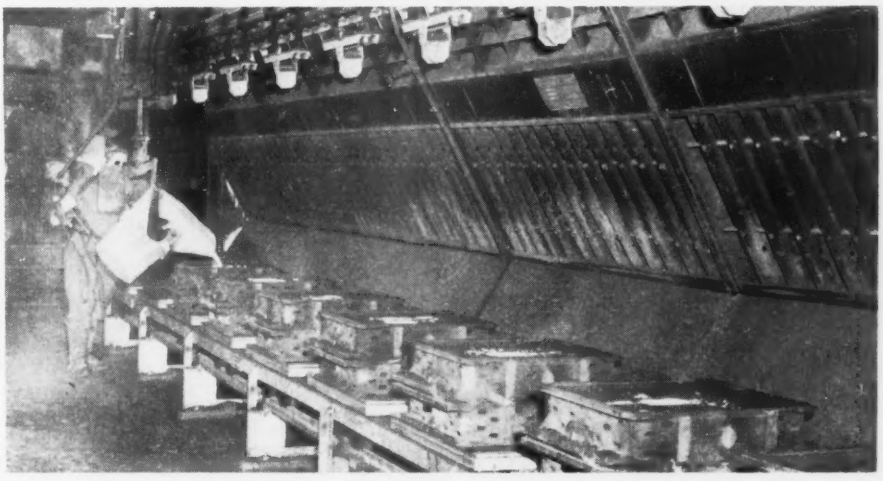
Wheels on the core-setting device permit the core plate and flask to be rolled ahead into a pneumatic rollover, as the next mold section comes out of the jolt-squeeze unit. Air clamps on the rollover hold plate and flask as they are rolled 180 degrees and are released at completion of the roll to permit an air plunger to push them off on a wheel conveyor at 90 degrees to their previous line of travel.

Here the core plate is removed manually and placed on the same monorail conveyor which brought it to the machine, to be returned to the coreroom. Mold sections are pulled along this section of wheel conveyor by a shuttling pneumatic plunger to which is mounted a pivoted dog, which hooks onto a lower edge of the flasks. After the core plate has been removed, the drag is pulled under a series of air jets at 70 psi which blow away loose particles of sand.

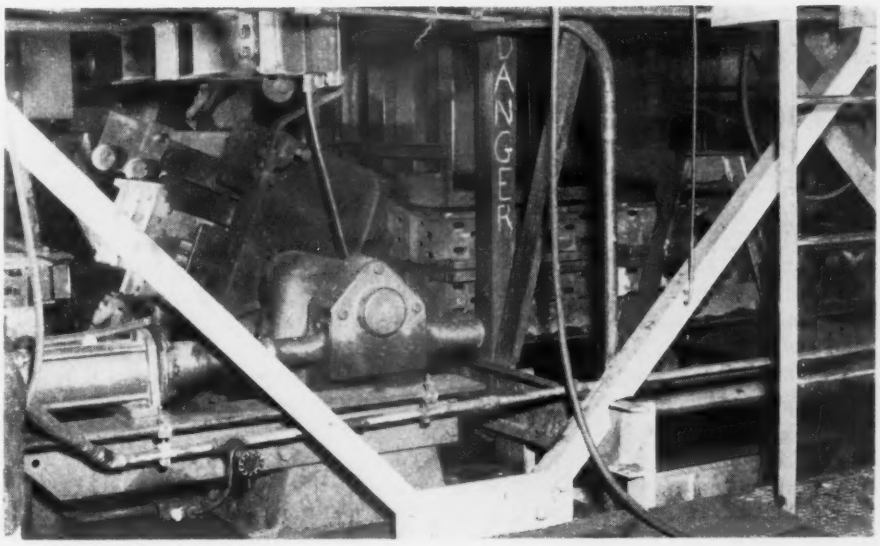
Copes enter the main production line just beyond the air jet station. Clamps mounted on a pneumatically-operated shuttle lift the copes from the wheel conveyor bringing them from the jolt-squeeze machine; they



Empty coresetting plate is removed from the drag and placed on a carrier of the overhead monorail delivery conveyor to be returned to the coreroom



Molds are conveyed under a compensating air ventilating hood for pouring



Pneumatic device rolls mold over to place drag on top ready to be pushed to the knock-out, center above. Plunger pushes casting to vibrating conveyor, and vibrating frame at right removes adhering sand from the flasks

are carried over the drag and lowered into position, the shuttle returning for the next cope.

The previously described air plunger and dog then pushes the closed molds into a pneumatic lowering device which places them on a car conveyor passing underneath. Lowering of the mold is synchronized with the car conveyor and the molding unit through a limit switch closed by cars on the conveyor to actuate air cylinders operating the mold pusher and lowering device.

The car conveyor circles around to pass in front of a compensating air ventilating hood along one side of the molding unit for pouring from a hand-pushed 1000-lb capacity ladle mounted on an an overhead monorail. Raising and lowering of the ladle is done electrically through push buttons mounted on the shank handle. Molds are poured at 2700-2750°F and are conveyed on an inclined track through a cooling tunnel about 100 ft long. The conveyor makes a 180-degree turn in the tunnel to bring the molds back toward the molding unit into the knockout station about 8-ft above floor level.

As the mold emerges from the tunnel it trips a switch, actuating an air cylinder to push the mold off the car conveyor at 90 degrees to its travel to a pneumatically-operated rollover device, which rolls the drag on top. Upon completion of the rollover the mold is pushed from the rotating device by another air cylinder plunger, 90 degrees from its previous line of travel, to a knock-out device consisting of six fingers mounted on an air plunger operating in a vertical plane. The six fingers fit into the openings formed by bars in the bottom of the drag flask to push out the casting and sand, which fall to a vibrating pan conveyor.

Then the closed flasks are pushed to a vibrating frame for removal of loose sand and moved on again into position under a pneumatically operated shuttle. Clamps on the shuttle grasp the drag flask and remove it to the gravity wheel conveyor feeding the drag jolt-squeeze machine.

In the meantime one end of a tilting wheel conveyor section on which the cope has been resting drops to permit the cope flask to roll down to a pneumatic rollover device, which turns the flask joint down and releases it to the gravity wheel conveyor feeding the cope jolt-squeeze machine.

Sand and castings are moved by the vibrating pan conveyor to a vented rotary sprue breaker 5 ft diam and 12 ft long. The perforated revolving barrel in this unit permits sand to fall through to a vibrating conveyor for transport back to the sand system. Castings fall to another vibrating conveyor for discharge into monorail-conveyed baskets. This vibrating conveyor operates only when a basket on the monorail conveyor stops underneath it for a predetermined period of time. Vibration and monorail conveyor movement is governed by a switch tripped by the baskets.

The automatic molding system is manufactured by SPO Inc., Cleveland.

How To Do It . . .

Radiant Screen Shields Operator From Melting Furnace Heat

HEAT given off by the melting furnaces at the National Bearing plant of American Brake Shoe Co., Chicago, was so intense that it was impossible for anyone to stand in front of them for more than 5 minutes at a time. Charging and unloading the furnaces was a problem, and to do his job quickly and efficiently, the operator needed protection from the heat.

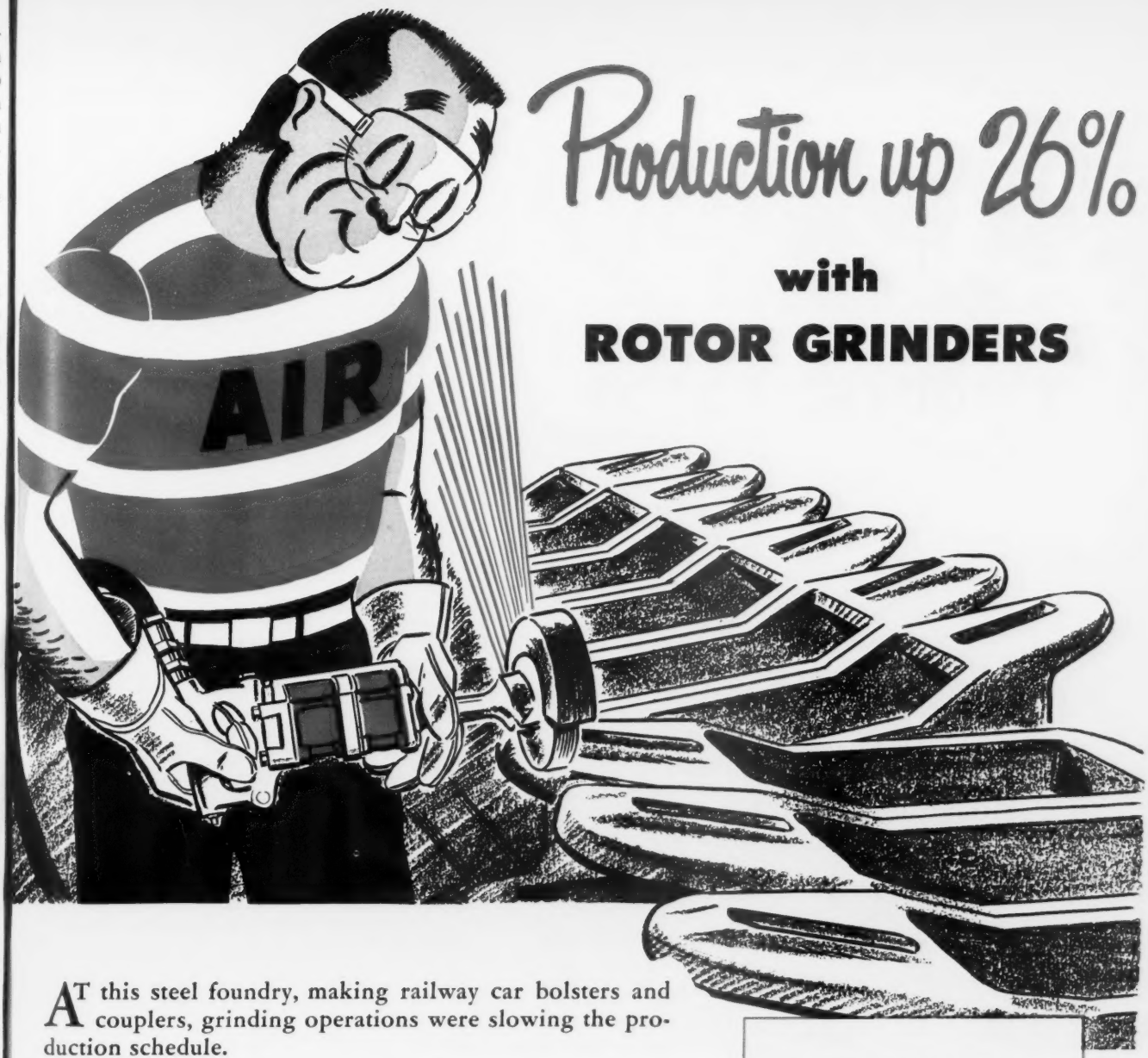
To solve the problem, the industrial hygiene department suggested erection of a radiant heat screen between the operator and furnaces. The screen was constructed of ordinary close mesh copper screening fitted into a steel frame and raised and lowered by an air cylinder. Any kind of heavy gage screening will do the job, but copper or aluminum are better reflectors of radiant heat.

During the melting operation the screen is down and shields the operator from the heat. When the furnaces are to be charged or unloaded the screen is raised. Reduction of heat through use of the screen makes the furnace operator's work easier and safer.

Man at the left in the illustrations is Sam Aleo; at right is Bulah Keys.

Reprinted by permission of *Brake Shoe News*, American Brake Shoe Co.

Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $10 for each idea submitted and published. Send a photo or drawing with your idea



Production up 26%

with ROTOR GRINDERS

AT this steel foundry, making railway car bolsters and couplers, grinding operations were slowing the production schedule.

PROBLEM: Need for more finished pieces per day. Reduction of high wheel cost. Reduction in "down time" of equipment for repairs. Formerly used 8″, 13-pound grinders.

SOLUTION: Rotor Application Engineer recommended 6″, 6,000-rpm Rotor Grinders. Weigh only 9¾ lbs.

RESULTS: Production stepped up 26%. Less operator fatigue. Wheels last longer. Finishes are better.

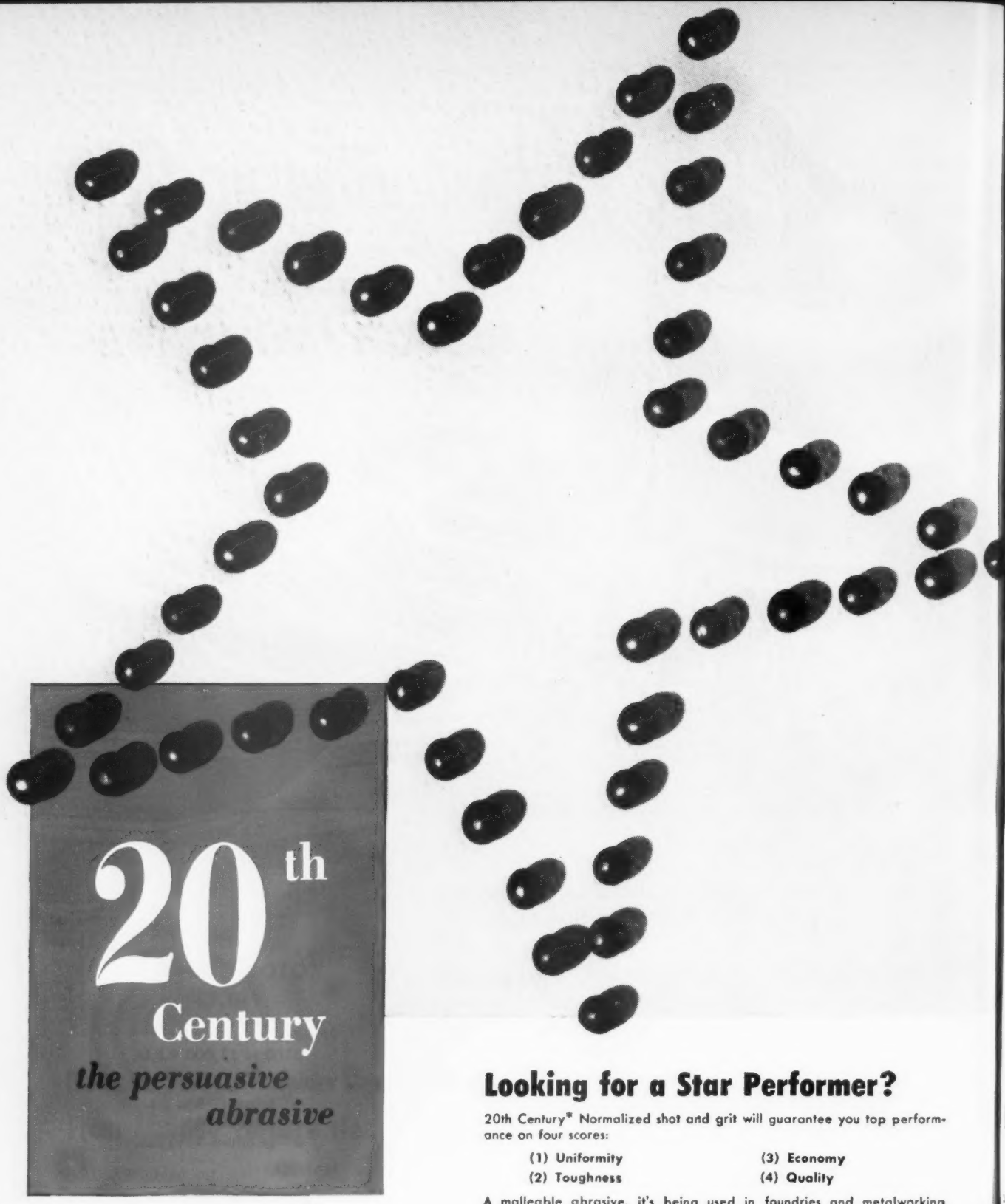
The Rotor Application Engineer can help *you* too. Call or write for Catalog #38.

ROTOR GRINDER FACTS

SPEEDS
3100 to 21,000 R.P.M.

WEIGHTS
4″ grinder—8¾ lbs.
6″ grinder—9¾ lbs.
8″ grinder—11¼ lbs.

HANDLES
Straight or Spade.



20th Century

the persuasive abrasive

Looking for a Star Performer?

20th Century* Normalized shot and grit will guarantee you top performance on four scores:

(1) Uniformity
(2) Toughness
(3) Economy
(4) Quality

A malleable abrasive, it's being used in foundries and metalworking plants everywhere.

Our new catalog is yours for the asking.

*Copyrighted Trade Name

THE CLEVELAND Metal Abrasive CO.

800 East 67th Street Cleveland 8, Ohio
Howell Works: Howell, Michigan

One of the world's largest producers of *quality* shot, grit and powder —Normalized—Hard Iron—Cut Wire

Foundry Statistics

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1951	1,085,241	656,076	.....
1952			
Aug.	63,716	39,308	162,832
8 mo.	605,329	377,508	.....
Sept.	75,950	45,849	168,367
Oct.	88,062	52,922	168,609
Nov.	76,099	46,708	167,842
Dec.	80,680	50,485	173,494
Total	926,120	573,472	.....
1953			
Jan.	87,249	53,272	174,809
Feb.	86,515	51,963	175,088
Mar.	94,481	57,025	177,776
Apr.	95,923	57,757	174,514
May	82,050	48,011	160,387
June	86,514	50,819	151,016
July	77,111	45,413	137,251
Aug.	73,855	45,415	120,801
8 mo.	683,698	409,675	.....

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Shipments—Die	Unfilled Orders[2]
1951	515,131	193,378	160,011	151,465	.....
1952[3]					
Aug.	39,197	15,834	10,493	11,730	117,648
8 mo.	322,092	127,361	89,523	98,581	.....
Sept.	45,430	16,733	12,515	15,888	127,777
Oct.	51,631	17,826	15,191	18,284	132,624
Nov.	46,483	15,419	13,463	17,372	138,461
Dec.	53,343	17,277	16,191	19,608	146,499
Total	518,979	194,616	146,883	169,732	.....
1953[3]					
Jan.	55,629	19,158	16,147	20,052	142,542
Feb.	54,864	17,583	16,698	20,272	148,557
Mar.	59,423	18,989	17,865	22,255	145,749
Apr.	61,582	20,009	18,583	22,620	141,231
May	57,602	19,600	16,479	21,208	138,037
June	56,820	19,330	15,535	21,675	136,437
July	51,653	16,664	15,733	18,915	126,426
Aug.	50,892	16,007	16,294	18,200	126,986
8 mo.	448,465	147,340	133,334	165,197	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled Orders[2]
1951	1,197,443	1,075,437	69,883	.....
1952[3]				
Aug.	78,798	71,273	5,154	89,310
8 mo.	659,755	593,982	42,941	.....
Sept.	85,815	78,278	4,680	89,034
Oct.	93,102	84,544	5,518	86,779
Nov.	80,439	72,281	5,011	82,393
Dec.	90,799	81,777	5,715	76,871
Total	1,009,910	910,862	63,865	.....
1953[3]				
Jan.	85,781	76,686	5,388	80,793
Feb.	85,183	76,847	5,061	76,578
Mar.	92,798	83,639	5,716	69,490
Apr.	94,362	85,471	5,462	72,291
May	85,223	76,912	4,855	66,926
June	84,656	76,333	4,706	64,535
July	71,041	64,451	3,926	61,209
Aug.	78,142	70,557	4,890	62,729
8 mo.	677,186	610,896	40,004	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1951	30,825	28,090	.....
1952[3]			
Aug.	2,478	2,390	14,288
8 mo.	22,448	21,301	.....
Sept.	3,090	2,949	16,833
Oct.	3,250	3,070	16,237
Nov.	2,959	2,785	17,053
Dec.	3,110	2,872	16,020
Total	34,857	32,977	.....
1953[3]			
Jan.	3,073	2,825	15,680
Feb.	3,225	3,033	14,834
Mar.	3,362	3,093	13,608
Apr.	3,294	3,046	12,709
May	2,679	2,434	13,635
June	3,136	2,666	13,664
July	2,372	2,084	13,840
Aug.	2,559	2,279	13,125
8 mo.	23,700	21,460	.....

Foundry Production Workers

Estimated Number

(Thousands)

	July 1953	June 1953	July 1952
Ferrous	215.4	219.9	210.8
Nonferrous	79.3	80.3	72.7

Average Weekly Earnings

	July 1953	June 1953	July 1952
Gray Iron	$76.26	$76.96	$64.33
Malleable Iron	77.90	78.72	64.81
Steel	79.19	81.76	74.86
Nonferrous	80.19	80.38	73.90

Average Weekly Hours

	July 1953	June 1953	July 1952
Gray Iron	41.0	41.6	38.5
Malleable Iron	41.0	41.0	36.7
Steel	40.2	41.5	41.2
Nonferrous	40.5	40.8	40.1

Labor Turnover Rate (July)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	7.2	5.6	2.8	2.2
Malleable Iron	3.7	4.8	3.1	0.5
Steel	1.8	4.9	2.3	1.9
Nonferrous	3.3	5.1	2.7	1.6

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(Net tons[1])

	All Castings—Total	All Castings—For Sale	Miscellaneous Castings Total	Miscellaneous Castings For Sale	Heavy Steel Ingot Molds Total	Heavy Steel Ingot Molds For Sale	Chilled Railroad Car Wheels Total	Pressure Pipe & Fittings Total[4]	Soil Pipe & Fittings Total[4]	Unfilled Orders[3]
1951	14,988,555	8,453,048	9,573,347	4,471,539	2,614,517	1,257,542	639,996	1,473,192	687,503	.....
1952										
Aug.	1,001,629	602,025	596,369	295,861	198,856	99,760	35,606	108,313	62,485	1,513,166
8 mo.	8,305,191	4,840,306	5,294,731	2,523,955	1,298,674	624,565	374,708	893,188	418,371	.....
Sept.	1,119,373	629,708	676,732	309,299	230,219	107,987	39,912	107,847	64,663	1,450,723
Oct.	1,233,480	688,837	759,131	340,695	243,462	117,255	45,664	117,089	68,134	1,391,609
Nov.	1,060,735	593,779	649,316	296,674	218,349	104,035	41,655	99,196	52,219	1,309,252
Dec.	1,141,658	619,070	713,332	321,939	247,605	116,410	42,957	95,198	42,566	1,316,308
Total	12,860,437	7,371,700	8,113,242	3,792,562	2,238,309	1,070,252	544,896	1,312,518	651,472	.....
1953										
Jan.	1,161,945	622,392	730,216	324,330	252,181	118,514	38,385	93,930	47,233	1,333,255
Feb.	1,135,868	607,160	721,847	315,101	228,360	106,398	44,420	93,152	48,089	1,332,038
Mar.	1,264,271	674,720	800,390	341,656	250,447	119,630	41,414	114,885	57,135	1,375,886
Apr.	1,277,288	683,047	799,872	329,802	246,873	122,702	44,877	120,105	65,561	1,305,849
May	1,185,545	641,581	734,326	312,836	238,202	115,728	41,373	113,136	58,508	1,271,711
June	1,196,106	648,400	743,737	312,681	232,596	115,946	45,542	114,118	60,113	1,245,904
July	1,056,422	573,280	752,371	274,890	212,187	106,526	36,715	97,739	57,410	1,232,651
Aug.	1,069,392	588,543	646,902	286,449	217,930	107,428	40,327	107,805	56,428	1,222,612
8 mo.	9,346,837	5,039,123	5,929,661	2,407,745	1,878,776	912,872	333,053	854,870	450,477	.....

Steel Castings—Shipments

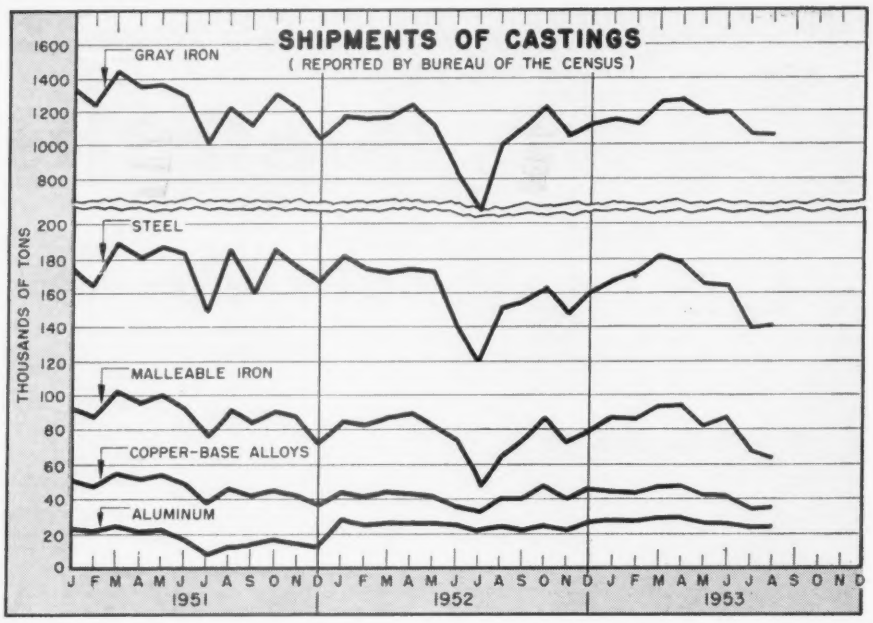
(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[3]
1951	2,050,054	1,506,903	466,172	1,541,280	1,162,687	415,915	508,574	344,216	50,157	.....
1952										
Aug.	150,232	113,997	24,498	107,203	81,123	21,626	43,029	33,359	2,872	809,354
8 mo.	1,291,664	997,581	245,409	929,812	719,111	215,767	363,842	281,932	29,642	.....
Sept.	158,392	121,402	20,686	109,011	82,968	17,843	49,381	39,190	2,843	781,929
Oct.	165,155	124,626	23,590	116,201	87,035	20,611	48,954	38,571	2,979	772,949
Nov.	148,259	110,467	23,148	105,314	77,979	20,681	42,945	33,349	2,467	751,687
Dec.	161,733	122,166	26,728	114,146	86,165	24,046	47,587	36,757	2,682	719,203
Total	1,925,203	1,476,242	339,561	1,372,494	1,053,264	298,948	552,709	430,429	40,613	.....
1953										
Jan.	167,211	126,819	27,150	118,423	118,423	24,788	48,788	38,121	2,362	706,490
Feb.	175,675	137,592	33,156	122,624	94,991	29,828	53,051	43,495	3,328	644,302
Mar.	182,181	141,873	34,364	129,055	100,069	31,772	53,126	42,286	2,592	634,600
Apr.	179,615	140,051	34,035	128,457	99,602	31,212	51,158	40,938	2,823	573,565
May	165,649	126,380	29,552	117,318	88,781	26,888	48,331	38,036	2,664	196,047
June	164,665	125,984	30,381	116,358	88,260	27,767	48,307	38,130	2,614	475,756
July	139,577	105,687	22,925	95,891	71,488	20,938	43,686	34,532	1,987	467,900
Aug.	141,340	107,941	25,026	97,076	73,784	22,637	44,264	35,003	2,389	418,927
8 mo.	1,315,913	1,012,327	236,589	925,202	735,398	215,830	390,711	310,541	20,759	.....

[1] Source: Bureau of Census. [2] For sale only. [3] Based on new sampling method; not comparable to prior figures. [4] All cast iron pipe is shipped for sale.

(Concluded on page 160)

FOUNDRY STATISTICS (Concluded from page 159)



Index of Foundry Equipment Orders

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1952	1953
Jan.	404.5	301.0
Feb.	200.4	257.3
Mar.	310.0	396.7
Apr.	385.1	303.0
May	225.2	294.4
June	353.8	446.8
July	343.9	440.8
Aug.	311.6	633.3
Sept.	365.9	317.2
Oct.	335.8	....
Nov.	258.1	....
Dec.	343.3	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Coke Production and Consumption

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1951	79,133,744	78,868,124	3,664,404
1952			
Sept.	6,180,804	6,517,682	269,029
9 mo...	48,787,612	47,352,977	2,166,539
Oct.	6,449,519	6,792,273	276,427
Nov.	6,316,660	6,418,639	252,803
Dec	6,690,649	6,981,036	246,107
Total .	68,244,440	67,876,964	2,955,241
1953			
Jan.	6,767,814	6,884,585	248,557
Feb.	6,132,084	6,263,083	237,670
Mar.	6,835,310	6,875,568	275,442
Apr.	6,538,477	6,536,195	272,228
May	6,820,985	6,748,957	274,236
June	6,613,614	6,683,768	254,836
July	6,750,381	6,656,222	218,470
Aug.	6,724,779	6,591,879	237,612
Sept.	6,401,979	6,302,490	235,859
9 mo...	59,564,823	59,543,747	2,254,727

Ingot Brass & Bronze

(Shipments in net tons)

	1952	1953
Jan.	28,315	24,423
Feb.	24,211	25,429
Mar.	23,890	28,256
Apr.	22,547	25,044
May	21,740	21,660
June	21,274	20,818
July	18,947	19,321
Aug.	21,807	20,156
Sept.	22,770	21,463
Oct.	25,811	.....
Nov.	23,441	.....
Dec.	22,983	.....
Total for year	277,736	.....

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1951	478,996	324,964	.....
1952[3]			
Aug.	27,622	18,618	70,548
8 mo.	251,469	172,967	.....
12 mo.	408,353	282,673	.....
1953[3]			
Mar.	51,673	35,460	90,266
Apr.	51,456	34,674	91,874
May	44,471	29,403	85,234
June	49,051	31,255	88,060
July	39,360	25,221	83,034
Aug.	38,214	24,230	77,895
8 mo.	366,749	242,706	.....

Pig Iron Production and Consumption

	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1951	70,264.5	3,186.2	3,169.0	55,134.1	8,774.8	63,760	5,731	354	136
1952									
Sept.	6,069.3	294.7	306.6	4,757.0	710.9	5,363	417	21	9
9 mo.	42,332.9	2,028.8	2,083.4	33,212.9	4,972.7	37,942	3,630	200	78
Oct.	6,415.3	280.0	299.4	5,091.6	744.2	5,812	463	24	9
Nov.	6,138.9	262.0	315.4	4,842.6	718.8	5,472	397	21	12
Dec.	6,414.7	293.4	315.1	5,106.9	699.2	5,685	419	24	14
Total	61,306.8	2,864.2	3,013.3	48,254.0	7,174.9	54,911	4,909	269	113
1953									
Jan.	6,470.6	274.9	285.5	5,201.5	708.8	5,784	425	24	12
Feb.	5,802.6	187.0	294.6	3,640.7	680.3	5,027	418	24	14
Mar.	6,601.1	263.9	358.1	5,256.1	723.0	5,873	466	27	14
Apr.	6,161.6	244.7	327.1	4,885.6	704.2	5,568	478	28	12
May	6,508.5	210.0	347.7	5,237.0	713.8	5,844	436	24	14
June	6,288.0	201.6	313.4	5,075.0	698.0	5,581	437	24	12
July	6,425.9	213.5	344.4	5,145.1	722.9	5,580	367	20	15
Aug.	6,381.1	202.1	310.7	5,167.1	701.2	....	....	....	....
Sept.	6,121.4	209.4	310.4	4,927.0	674.5	....	....	....	....
9 mo.	56,764.6	2,011.4	2,891.1	45,535.4	6,326.6	....	....	....	....

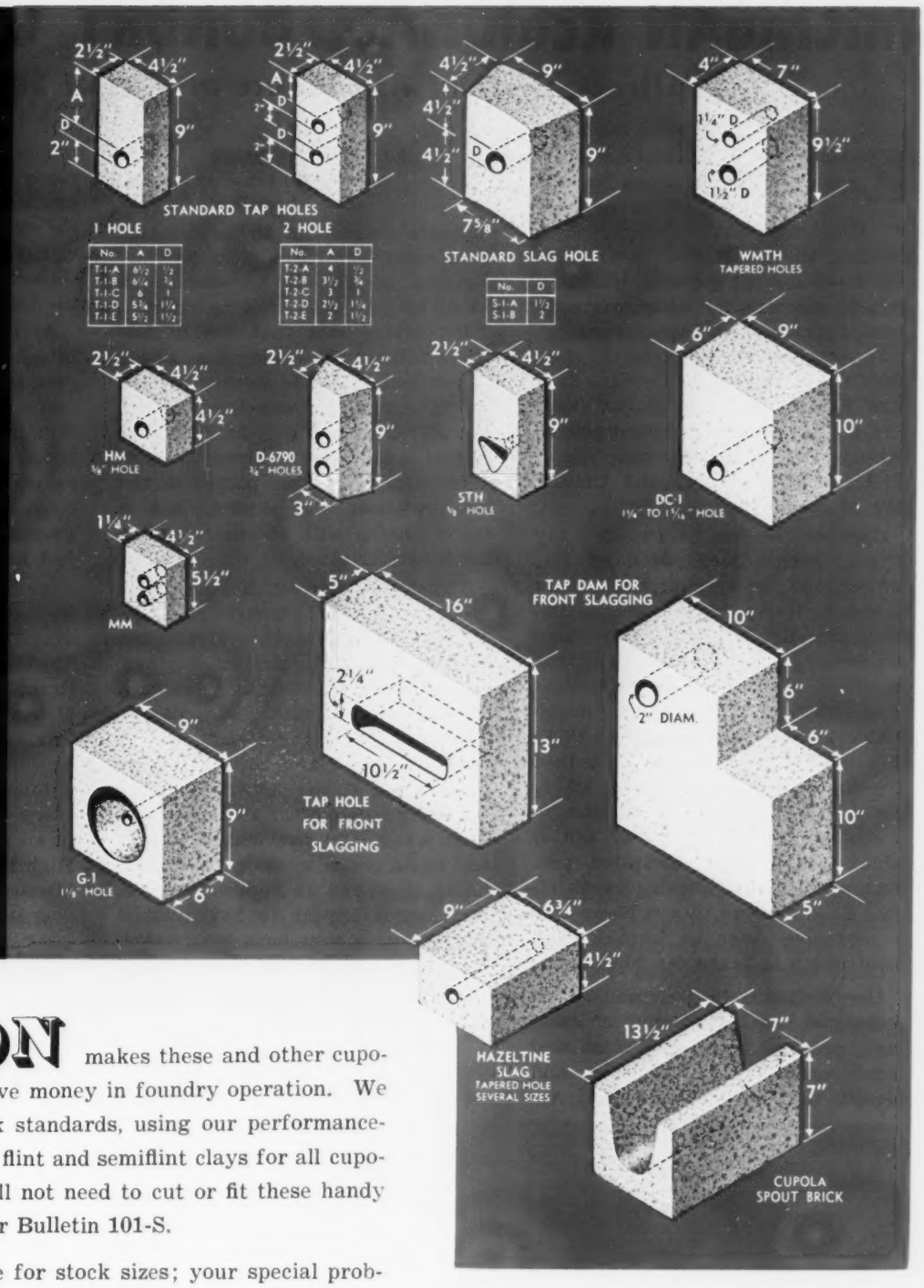
Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap—Total	All Scrap—Purchased	By Types of Furnace—Cupola—Total	Cupola—Purchased	Air—Total	Air—Purchased	Electric—Total	Electric—Purchased
1951	68,518,208	33,822,431	11,090,607	5,878,939	1,203,740	441,099	8,391,919	5,389,005
1952								
July	1,965,007	1,156,296	524,651	278,750	52,999	19,733	364,536	244,944
7 mo.	32,065,679	15,994,677	5,285,241	2,792,878	624,874	233,698	4,217,412	2,687,095
Aug.	5,470,696	2,738,593	721,255	348,181	74,351	28,091	682,405	446,543
Sept.	5,782,986	2,862,994	760,092	389,910	82,212	30,493	761,795	501,602
Oct.	6,256,031	3,066,041	851,458	439,401	98,947	37,743	814,565	546,189
Nov.	5,960,435	2,885,008	731,825	379,950	80,228	30,502	780,042	518,320
Dec.	6,089,722	2,973,633	804,275	412,177	92,621	35,064	758,845	491,084
Total	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,835
1953								
Jan.	6,256,718	3,061,551	810,254	413,971	95,430	35,695	795,292	517,963
Feb.	5,802,854	2,817,896	818,375	422,306	92,371	35,234	745,179	478,456
Mar.	6,536,867	3,211,476	901,786	464,110	103,034	38,583	857,760	563,489
Apr.	6,227,089	3,026,533	921,589	474,185	106,449	41,004	820,647	531,509
May	6,294,920	3,105,598	861,404	450,477	92,703	35,566	798,098	523,606
June	5,951,170	2,835,875	876,320	454,905	99,799	38,934	743,530	468,129
July	5,539,468	2,597,365	729,114	369,283	74,815	26,755	691,521	443,263
7 mo.	42,609,086	20,656,294	5,918,842	3,049,237	664,601	261,771	5,452,027	3,526,447

*Source: U. S. Dept. of Interior. Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only [3]Based on new sampling method; not comparable to prior figures.

Run your foundry on a high production schedule with these quick-to-install cupola specialties



IRONTON makes these and other cupola specialties to help you save money in foundry operation. We hold to Ironton cupola block standards, using our performance-proved mixture of Kentucky flint and semiflint clays for all cupola specialties. Your men will not need to cut or fit these handy ready-to-use shapes. Get our Bulletin 101-S.

We make no mould charge for stock sizes; your special problem can be solved economically. Tell us what you need (stock or special) for earliest possible delivery.

YOUR IRONTON REPRESENTATIVE IS A GOOD MAN TO KNOW. For his name and address, call Jim Rickey at Ironton 109; we accept collect calls.

NEW MONEY-SAVING LADLE COVER IS HERE

Heat costs money, so you save money when you hold the heat with LITE-ROCK Ladle Cover. Ironton supplies this granular featherweight inert mineral insulation that is poured or shoveled directly on top of metal in the ladle. LITE-ROCK forms a blanket of any thickness you need, floats with the slag, cannot contaminate the metal. Write for details.

RELIABLE REFRACTORIES

THE IRONTON FIRE BRICK COMPANY
IRONTON, OHIO

BERLITE • RAVENITE
CARO-LINE • NOJOINT • ALSET • GUN-ON
KENTUCKY FIRE CLAY BRICK • SPECIAL SHAPES

MICHIGAN REGIONAL FOUNDRY CONFERENCE

Attracts Student Attendance at Special Session

By EDWIN BREMER
Metallurgical Editor

EXCELLENT attendance marked the Michigan Regional Foundry Conference held at Michigan State College, East Lansing, Mich., Oct. 8-9. Nearly 450 registered for the meeting, including over 90 students, for whom a special session was held on Friday morning.

Sponsors of the conference were the Central Michigan, Detroit, Saginaw Valley, Western Michigan chapters of the American Foundrymen's Society, and the student chapters of Michigan State college and University of Michigan.

Opening session, with O. Jay Myers, Archer-Daniels-Midland Co., Minneapolis, as speaker and Frank Brewster, Harry W. Dietert Co., Detroit, presiding, related to "D" process molding. Mr. Myers stated that in this process a fine clay-free sand from 100 to 150 AFS fineness is mixed with iron oxide in the dry state (91½ lb sand to 2½ lb oxide), and then 2½ lb of a special viscous oil is added. Mass is mixed 6 minutes in a muller, and 3½ lb of fly ash is added to aid in oil absorption, prevent sticking, and provide workability. Sand mixture then is blown into a contoured drier to form a shell mold which is baked for 20 minutes.

Use of shell molds produced by the process reduces machining of castings, provides a good surface and better control, a cleaner shop, and permits use of less skilled labor. Advantages claimed for the process include relatively lower cost, no segregation of binder, nor obnoxious odors, no core washes or moisture.

Mr. Myers said that use of hot driers will cut the baking time about 30 per cent. He also mentioned that the "D" sand mix was tried experimentally as a facing ½-in. deep, and backed with regular green molding sand. Gray iron was poured in the mold without any drying, and a sound casting with excellent surface finish was obtained.

Thomas E. Barlow, Eastern Clay Products Division, Chicago, spoke on "High-Pressure Molding" at the second session. K. Harrison, Saginaw Malleable Iron Division, Saginaw, Mich., was chairman. Mr. Barlow pointed out that under high squeeze pressures, the water in the sand is forced out onto the pattern, and it is necessary to use other binding agents than water. A combination of dry and liquid resins works satisfactorily under pressures as high as 600 psi. Such sands appear to have infinite flowability; a firm hard mold developed under 100 psi can be remolded or squeezed still more with increasing pressures.

Mr. Barlow pointed out that as yet only experimental work has been conducted at 600 psi, but any foundryman could investigate higher pressures by using large commercial molding machines with small flasks. He said that dimensional tolerances of molds will vary with the pressure—the higher the pressure, the closer the tolerance.

At the noon luncheon Fred Walls, International Nickel Co., Detroit, presided, and Dean Loren G. Miller (ret.) welcomed those in attendance. William W. Maloney, American Foundrymen's Society, spoke briefly on the activities of the society, and commented on the International Foundry Congress from which he just had returned.

At the first afternoon session, with John VanHaver, Sealed Power Corp., Muskegon, Mich., presiding, Theodore Redin, Wm. Demmler & Bros., Kewanee, Ill., described a mold blowing machine developed by his firm. Using a combination blow and squeeze action, the machine operates automatically to produce a mold every 8.2 seconds. It was described in an article, "Mold Blower Provides High Production Rate," by Robert H. Herrmann in November FOUNDRY.

With Henry Laforet, Lakey Foundry Co., Muskegon, Mich., presiding, Ray Sutter, Sutter Products Co., Detroit, discussed shell molding machines made by his firm. Operating on automatic cycles they produce from 45 to 60 shells per hour depending

(*Concluded on page* 164)

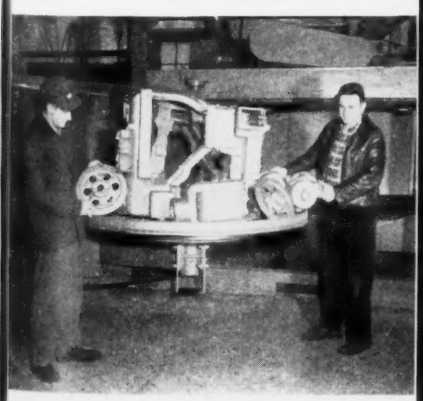
Left—Dave Boyd, Engineering Castings Inc., Marshall, Mich., and Jess Toth, Harry W. Dietert Co., Detroit, taking it easy. *Center*—Representatives of Michigan University, Michigan State College, Detroit University and Wayne University appear to be closing a deal. *Right*—Toastmaster Vic Crosby, Climax Molybdenum Co., Detroit, is making a point. Photographs by courtesy of Michigan State College

HOW BIG MUST A FOUNDRY BE TO PROFIT FROM WHEELABRATOR® CLEANING?

No foundry is too small to save with the Airless Wheelabrator. Many foundry owners, who once believed their tonnage too small to justify its use, now say they could not operate without their Wheelabrator. They have discovered it saves time and speeds production — makes their prices and quality of cleaning more competitive — makes profitable job cleaning possible — creates new sales opportunities and its overall savings are usually sufficient to amortize entire investment in from six to 18 months.

TWO MOLDER SHOP *Triples Production Increases Sales*

The M & H Foundry, Neponset, Mass., consisting of the two owners and two helpers, are able to triple production with their Wheelabrator. An 8 hour cleaning job has been reduced to less than one hour's time.

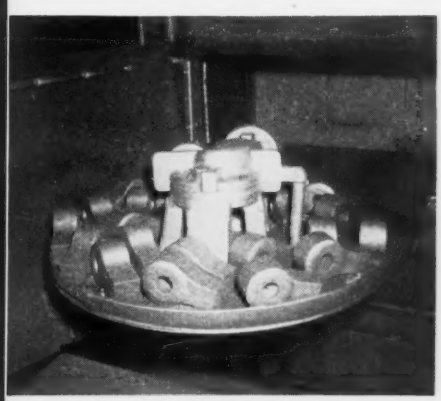


saves $7.06 per ton CLEANING 550 tons ANNUALLY

Keystone Brass Co. replaced a wet blast mill with a Wheelabrator Tumblast and cut labor requirements 7 manhours daily. It cut cleaning costs 67% and saved its cost in approximately a year.

saves 18 manhours per ton CLEANING 43 tons MONTHLY

Installation of a Wheelabrator Swing Table in a Canadian steel foundry eliminated the labor of 4 chippers and grinders and saved $4,644.00 yearly cleaning only 43 tons per month. New business has resulted.



"Small Foundries, Too, Save Money with Wheelabrator". A bulletin of this title shows how it can be done. Ask for Bulletin No. 874.

American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Indiana

Manufacturers and Selling Agents: CONTINENTAL EUROPE—George Fischer, Ltd., Schaffhausen, Switzerland; BRITISH COMMONWEALTH—Tilghman's Patent Sand Blast Co. Ltd., Broadheath, England; JAPAN—Tokyo Boeki Kaisha, Tokyo; BRAZIL and ARGENTINA—Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; AUSTRALIA—McPherson's, Melbourne; MEXICO—Casco, S. De R. L., Mexico, D. F.

(*Concluded from page* 162)

upon coating and curing times required. Austin Beach, Foundry Equipment Ltd., Leighton Buzzard, England, in discussing shell molding said that 300 lb of sand-resin compound can be mixed thoroughly in 7½ minutes in a paddle-type mixer with sigma-shape blades. Since resin is expensive, he holds shell thickness to 3/16-in. as it was found that such thickness will hold 200 to 250 lb of metal. With that shell thickness maintenance of even temperature in investing and curing is essential.

Mr. Beach eschews use of adhesives, clamping or bolting for fastening shells together, preferring to place the shells in flasks and backing with green sand as described in "Foundry Developments" on page 170 in the November issue. He concluded his talk with a motion picture depicting green sand and shell molding operations.

With A. E. Demmler, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., presiding, Robert Zoller, Zoller Casting Co., Bettsville, O., described a water-cooled cupola having only a thin lining of basic refractory material. Details of the cupola and results obtained were described in "Drops Cupola Bottom Once a Week" published in the September issue.

Core Dried in Dielectric Ovens

At the first session on Friday morning, A. E. Jacobson Jr., Grand Haven Brass Foundry, Grand Haven, Mich., discussed various types of materials for core driers to be used in dielectric ovens. These include oil-sand, sawdust-resin, and glass fiber-resin. The first type is least costly and easy to make, but is awkward to handle, and cores cannot be blown into them. However, they are useful for short runs.

Sawdust-phenolic resin combination, while more expensive than the oil-sand, withstands rough handling. Cores cannot be blown into them nor can they be used as half-coreboxes since they do not have the necessary detail but they serve satisfactorily for medium runs of cores. Glass fiber-resin has the highest cost since it requires pressing into shape in a mold or die. Driers made with that material are accurate in dimension and can be used for blowing cores and as half-coreboxes. They withstand abuse, and are ideal for high production runs of cores. Kenneth H. Priestly, Vassar Electroloy Products Inc., Vassar, Mich., was chairman.

Eugene Passman, Frederic B. Stevens Co., Detroit, presided over a session at which Charles Smith, Plastic Tool Co. of America, Eaton Rapids, Mich., and Fred Hodgson, Michigan State College, spoke. Mr. Smith described the use of epoxy resin reinforced with fiber glass in making the so-called plastic automobile bodies, and how that material could be formed into patterns. He also described the use of polyester phenolic or castable resins for pattern work. Those materials are poured or cast into plaster of paris or gypsum cement molds containing the pattern impressions, and then baked to harden the resin. Mr. Hodgson briefly touched upon the making

"But, Pop, why do they call it gray iron?"

of a plastic pattern for an automotive part which he undertook as a student project.

Charles Yaker, Michigan Steel Casting Co., Detroit, presented a talk on investment molding, with Rollin Banister, Midwest Foundry Division, Coldwater, Mich., as chairman. Mr. Yaker illustrated his talk with three-dimensional colored slides taken in the foundry with which he is associated.

An interesting description of an investigation of effect of pouring rate control was given by F. J. McDonald, Saginaw Malleable Iron Division, Saginaw, Mich., at a session at which Paul Olson, Eaton Mfg. Co., Vassar, Mich., presided. Some observations were that as pouring rate increased, the severity of slag defects increased on parts liable to slag, and such defects were found whether or not skim cores were used. Constant pouring height is very beneficial, and the height should be determined experimentally. Skim cores in the gating system can be eliminated if smaller sprues or choking of the runner are used to control pouring rate.

At 11 o'clock on Friday a special session was held for students, with Horace Dean, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., and Fred J. Walls, International Nickel Co., Detroit, presiding. Edward J. Walsh, Foundry Educational Foundation, Cleveland, gave a talk on the aims and activities of FEF, and described how it helps young men obtain an insight on foundry operations, and embark upon a foundry career.

Dean Clement J. Freund, University of Detroit, told the listeners "How To Prepare for a Foundry Career". Following a luncheon the students saw the sound film "Technique for Tomorrow," prepared by Ford Motor Co. and showing various operations at its Cleveland plant as well as how young men are trained there. Following presentation of the film John Stirling, Ford Motor Co., spoke on "Young Men in the Foundry Industry."

Following the technical sessions those in attendance broke up into several groups to attend luncheons followed by roundtable discussions. That on nonferrous had Manley Brooks, Dow Chemical Co., Bay City, Mich., as chairman, and he was assisted by a panel composed of Frank Brewster, Harry W. Dietert Co., Detroit; A. E. Jacobson Jr., Grand Haven Brass Foundry, Grand Haven, Mich., and Al Peters, Dow Chemical Co.

Roundtable on gray iron was under the direction of Dr. Richard Schneidewind, University of Michigan, Ann Arbor, Mich., and the assisting panel included O. Jay Myers, Archer-Daniels-Midland Co., Minneapolis; Don Gilchrist, Homer Foundry Co., Coldwater, Mich., and W. Geisler, Leter B. Knight & Associates, Chicago.

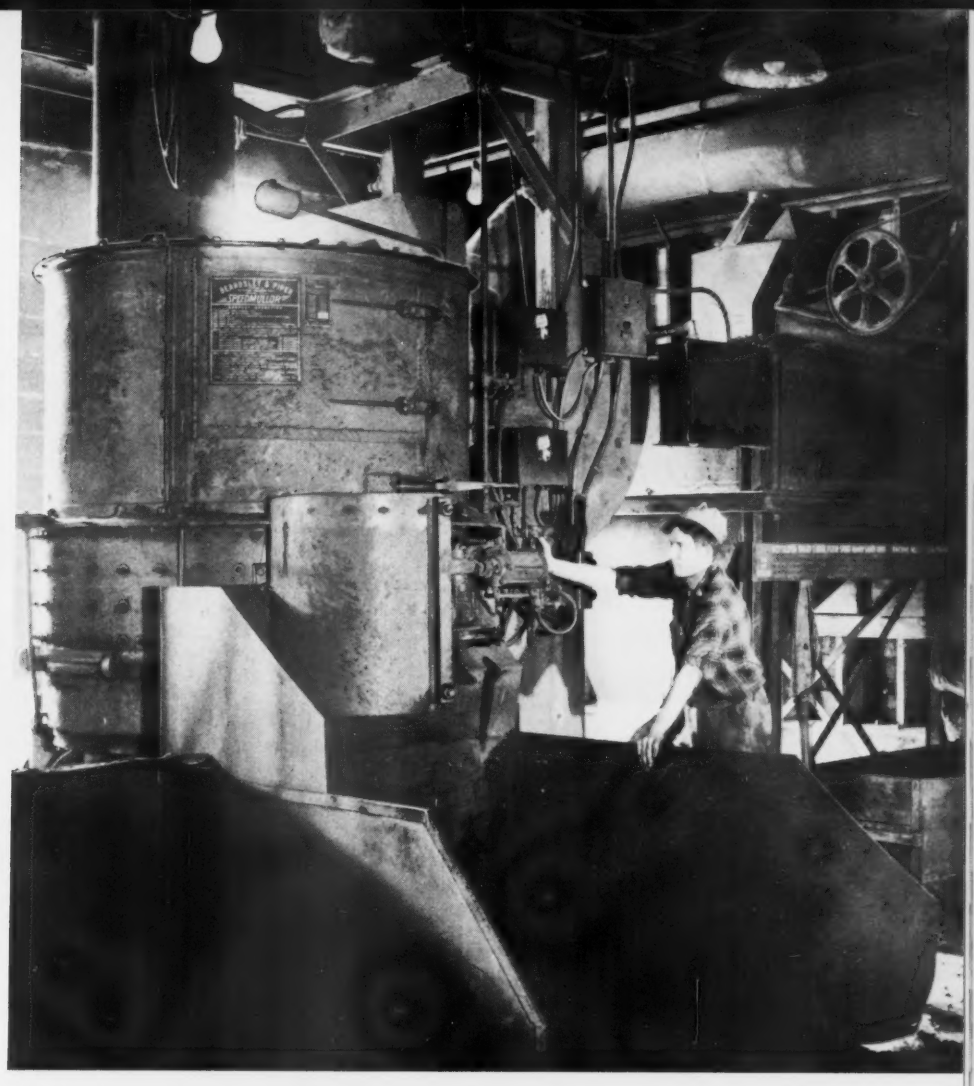
Malleable roundtable discussion had Frank Rote, Albion Malleable Iron Co., Albion, Mich., as chairman. Panel was composed of Mayo Roe, Archer-Daniels-Midland Co., Detroit; Prof. Richard Flinn, University of Michigan, Ann Arbor, Mich., and Theodore Redin, Wm. Demmler & Bros., Kawanee, Ill.

Conference closed with a showing of a film on gating prepared under the sponsorship of the American Foundrymen's Society.

Malleable Founders Offer Article

Number 47 in a series of bulletins published by the Malleable Founders Society under the title *Malleable Iron Facts* is an article called "Tolerances and Specifications of Malleable Castings," by James H. Lansing, technical and research director of the society

A 60% SAVING IN MATERIAL AT OTACO LIMITED



SPEEDMULLOR SAVES ON BONDING MATERIAL AND MAN-HOURS

Otaco Limited at Orillia, Ontario, solved their sand preparation problem by installing a Model "60" Speedmullor to mull all of the foundry's molding sand.

The *thoroughness* of Speedmullor mulling resulted in a 60% reduction in bonding material per batch.

The *speed* of Speedmullor mulling cut sand preparation labor costs by up to 40%.

The *accurate control and uniformity* of Speedmullor mulling boosted casting quality and surface finish.

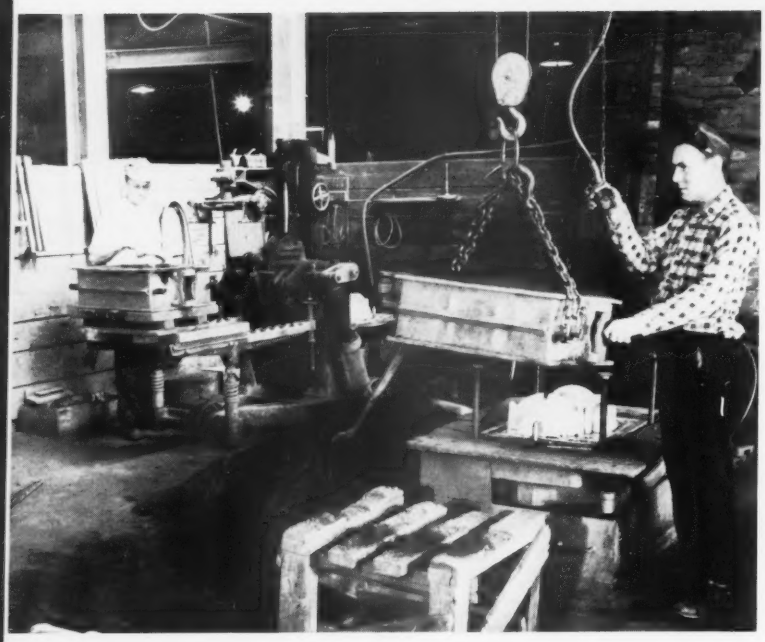
Results like this can be yours—write now for full information to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Illinois.*

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

B&P

FEMA

WHEN THE PRESSURE'S ON



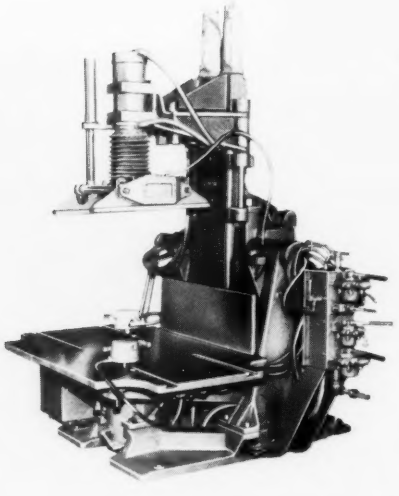
Large valve and hydrant casting molds are made on these cope and drag machines. For copes—a J&J 812S Jolt Stripper—capacity 1600 lbs.—table size 25 x 30 inches. For drags—a J&J 612 RPB Jolt-Rollover-Draw—capacity 600 lbs.—table size 24 x 30.

PHILIP GIES FOUNDRY CHOOSES J&J MACHINES

For molding a large variety of pressure work, the Philip Gies Foundry at Kitchener, Ontario, installed J&J Jolt-Rollover-Draw and Jolt-Stripper molding machines. Results have been so satisfactory that the foundry is now installing another large J&J Jolt-Stripper . . . to make molds in large quantity for 7-foot hydrant castings.

The machines at Philip Gies have been giving top performance for many years. Newer J&J machines offer many improved features. The popular new J&J 920 RB machine shown below features an automatic adjustable flask equalizer and automatic pattern board clamp. J&J Rollovers are available in capacities to 10,000 lbs. Write now for full information to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago*

Hydrant casting molds are made in quantity on this J&J 68S Jolt-Stripper. Flasks up to 24 x 36 inches are handled on this 600 lb. capacity machine.



The new J & J 920 RB with automatic pattern board clamp.

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

MEMBER FEMA

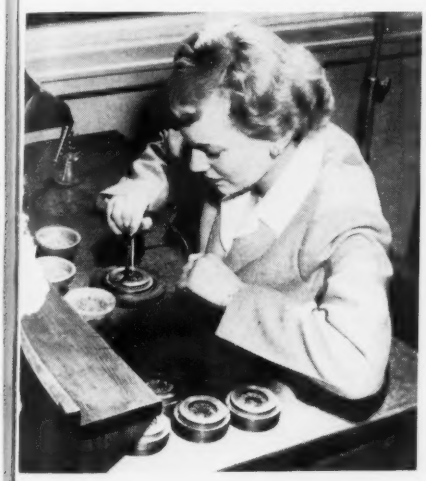
B&P

Foundry Developments

By EDWIN BREMER

ACCOMPANYING illustration shows one of the steps in manufacture of diamond drill bits at Copper Cliff, Ont., operation of International Nickel Co. of Canada Ltd. Young lady is using a glass vacuum pencil to pick up the tiny diamonds and place them in position in a perforated die plate prior to investing them with a molten alloy matrix. Die plate rests in a vacuum cup which holds the diamonds in place until they are sprayed with collodion.

The die plate with its diamond setting is placed in a mold block with a steel adapter threaded to fit



standard diamond drilling equipment. The whole assembly is placed in a vacuum cup and filled with the molten alloy matrix. After quenching the cast bit is trimmed, machined and buffed, and then age-hardened for 3 hr at 600° F, followed by slow cooling.

* * *

GLASS reinforced alkyd resin molding compound is being used to produce core driers for dielectric baking. Material is pressed into shape in cast aluminum dies at 600 to 1000 psi and 285 to 310°F. Resultant driers have high strength and dimensional stability, and are said to have dimensional tolerances of plus or minus 0.005-in.

* * *

DISCUSSING nonferrous melting the speaker recommended that records be kept of crucible life, pouring temperature, time of first heat and time of subsequent heats of different alloys to provide a source of information on possible furnace changes which result in melting time lag, shortened crucible life or lower quality metal. Such records checked periodically generally will warn of approaching danger in the melting operation and permit avoidance of unnecessary loss.

* * *

EXPERIMENTAL work indicates that resin bonded sand can be blown into contoured driers to form shell molds with a worthwhile saving in resin. In the particular study the fine sand contains 4 per cent resin and 2 per cent moisture with kerosene as the release agent. Mix is blown into plastic driers and baked in a dielectric oven for about 5 minutes. Indications are that urea formaldehyde resins can be used in the process, and that iron oxide, clay, silica flour and other extenders can be incorporated in the sand mix.

* * *

PROBLEM of placing a 1½-in. cored hole centrally in a large z-shape or "sigma" blade for mixing plastics was solved by Cooper Alloy Foundry Co., Hillside, N. J., by use of tubing. Casting was 18-8 stainless, and tubing of same material was carefully bent to form in a special jig so that it would be located centrally in the blade. Tubing was placed in the mold, and a few minutes before pouring was commenced a stream of water at 60 to 70 psi was admitted to the tube, and permitted to flow through it until about ½-hr after pouring. Gating was arranged so that the metal stream did not impinge directly on the tube.

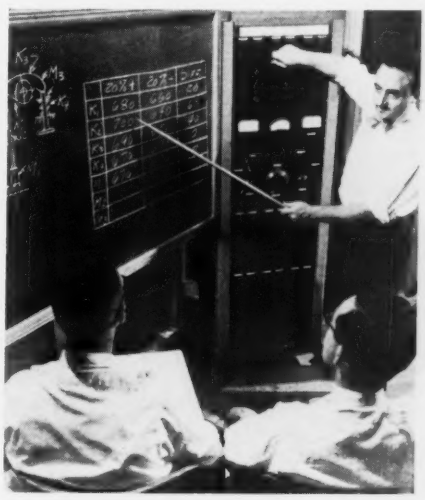
* * *

FURTHER study on penetration of molten metals into compacted sand by Hoar, Atterton and Houseman, and reported in the September issue of the *Journal* of the Iron and Steel Institute (London), led to the following conclusions: Penetrating pressure considerably increases as the degree of ramming increases for both fine and coarse-grain sand compacts. A close correlation exists between surface density of sand compacts and penetrating pressure; that between green air-permeability number and penetrating pressure is slightly less good.

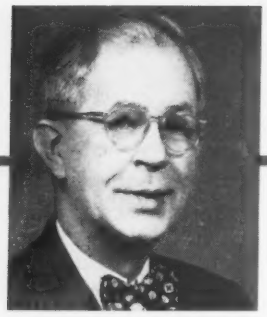
Sintering at 1600° C reduces penetrating pressure values below those calculated from low-temperature results; the effect is greater for soft- than for hard-rammed compacts and greater for fine than for coarse sand mixes in hard-rammed compacts, but is greater for coarse than for fine mixes in soft-rammed compacts. Penetrating pressure for iron falls considerably as temperature increases from 1560 to 1640° C for both soft- and hard-rammed compacts. Microscopic examination of compacts penetrated by tin and iron shows that sintering produces rounding of pores; these become somewhat fewer in number but greater in individual area, especially in soft-rammed compacts.

* * *

ELECTRONIC brain using less power to operate than the average TV set is solving complicated research problems at Ford Motor Co. 50 times faster than ordinary mathematical methods. Developed by research engineers of the engineering staff of the firm, the brain is known techni-



cally as a vibration analog computer. Six feet tall and weighing 250 lb, the device has 88 control knobs. By manipulating the controls Ford engineers can feed into the machine, design measurements of such parts as crankshafts, cams and valves taken directly from drawing boards, and determine the relative merits of proposed designs.



Man-to-Man

By RALPH L. LEE

What Makes a Leader?

"No matter what we do in evaluating leadership, the selection and development of our leaders will be more of an art than a science"

IN THE November issue of FOUNDRY we tried to show at least by bad example that there are some hard working, sincere people who simply do not have the minimum of what it takes to direct the efforts of others, no matter how hard they try. From this example and many others it seems pretty hard to arrive at any other conclusion than that outstanding leadership (that is, working through others) requires a natural talent with which some persons are born and others are not.

We agreed that one whale of a lot of bossing or supervising now is being done in this industry of ours by folks who are not particularly gifted with those natural talents for leadership. We also pointed out that our industry, together with industry in general, feels the serious need of improving our ability to get things done through others and is taking steps toward this end by carrying on supervisory educational and training activities in one form or another.

Then it seemed to add up that, without curtailing our training or educational efforts, we might well figure some way of sifting out those who show signs of having natural talent in this direction as material for development into supervisors, foremen, superintendents and what have you.

I mentioned that for many years I had been collecting signs of leadership I had found in common with outstanding bosses and promised to share my findings with you in this issue. So, good as my word—here we go!

SIGNS OF LEADERSHIP TALENT

1. Has a low voice and speech which is usually slow and thoughtful.
2. Is neat in personal appearance, in a conservative style.
3. Rarely hurries.
4. Does not show all he feels and thinks.
5. Looks you squarely in the eye without staring.
6. Is habitually punctual.
7. Is orderly (about himself and everything else).
8. Is accurate.
9. Is decent.
10. Laughs only when he means it, and then under control.
11. Rarely interrupts.
12. Rarely says "I".
13. Is not afraid to have others think he doesn't know when he doesn't.
14. Is not afraid of his job or anyone who seems to threaten it.
15. Is naturally inclined to listen more than to talk.
16. Is not inclined to argue.
17. Finds it difficult to hold grudges.
18. Rarely tells everything he knows.
19. Makes sure you know the difference between his opinions and his facts.
20. Is easy to meet and easy to leave.
21. Makes it almost impossible really to get his goat.
22. Is hard to sweep off his feet (makes up his *own* mind).
23. Quickly gets the point.
24. Shows people how without showing off or showing them up.
25. Never takes himself too seriously.
26. Doesn't try to do everything himself.
27. Expects the best of others.
28. Sees through pretense.
29. Likes people without getting sticky about it.
30. Keeps his head in emergencies.
31. Respects the confidence and confidences of others.
32. Has little talent for gossip or patience with gossipers.
33. Likes the job he has.
34. Has assurance without cockiness.
35. Has few crushes on individuals and few enemies.
36. Is not inclined to sit still for long.
37. Has good memory of great capacity.
38. Stands just so much, then tells you off without losing his temper.
39. Is patient (in every sense of the word).

I honestly believe that with very little hesitation it would be possible for anyone of us to answer yes or no to every one of these signs as they apply to some one we really know; in fact, on many occasions I have had every member of large groups select the very best boss they ever knew and then the worst. After answering YES or NO to practically the same list of characteristics, the percentage of yesses for the best and nos for the poorest came out unbelievably alike.

But in spite of all the effort I have put into gathering these signs and the encouraging accuracy with which they have been used as a leadership appraisal guide, I personally do not think this or any other appraisal system can be used as the sole basis either for selecting supervisors or for rating them after they have been selected.

It seems to be the nature of us human beings to develop the talents we do have to a point where they more than make up for the ones we lack. A person who loses an arm becomes amazingly skillful with the one he has and sometimes does a better job than he did before his accident. Having one deaf ear seems to sharpen the hearing of the other. The mechanical skill, experience and know-how of some individuals is frequently developed to a point where a group will follow them for the technical benefit they derive from their association with them, in spite of a woeful lack of

(*Concluded on page* 170)

protect your profits with APEX ... Z-50 ALUMINUM ALLOY

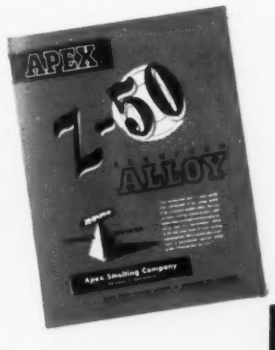
30th Anniversary Year

QUALITY AND ECONOMY
tested and proved on the job

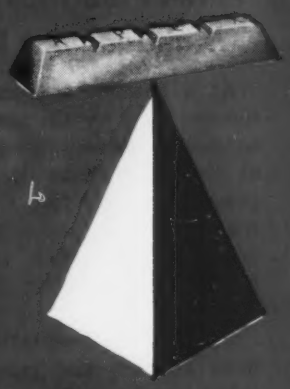
Above average mechanical properties, uniform casting characteristics and free machinability make Z-50 aluminum alloy developed by Apex an outstanding money saver on your production line.

Fulfilling the foundry's need for a quality all-purpose alloy, Apex Z-50 polishes and buffs to a satin finish, has excellent response to anodizing and other chemical and electrochemical finishes. Its as-cast properties are right for most castings, it may be treated for highly stressed castings, and it provides superior dimensional stability with an aging treatment.

Apex Z-50 is another superior product of Apex research and scientifically controlled production, tested and proved in the foundry field and in final application.



Send for your copy of Apex Z-50 folder showing composition, physical properties, and permanent mold and sand cast mechanical properties.



Research leadership back of every ingot

• • •

APEX SMELTING COMPANY

CHICAGO • CLEVELAND • LOS ANGELES

(*Concluded from page* 168)
leadership, instinct or talent. No matter what we do in the way of testing or evaluating leadership, the selection and development of foremen, superintendents and even managers will always be, I believe, more an art than a science.

In spite of all this, we all know that far too many of our bosses are selected primarily on the basis of their mechanical ability or their knowledge of the business, with the ability to handle people effectively playing second fiddle. Few will deny that getting people into the foundry and keeping them there once we have them is our major problem today.

A supervisor who can develop a mutually satisfactory personal relationship with his people on a MAN-TO-MAN basis is one of the best cures for a turnover problem and for grievances, accidents and scrap. And I am not so sure that such a supervisor is not also the most effective drawing card for attracting outsiders into the foundry.

In any event it certainly will pay us all to try any and every means offered to help us do a better job of selecting and developing good leaders of foundrymen—and it might not be a bad idea to apply some of the medicine to ourselves.

AMA Publishes Book on Management Reports

At a special methods review conference held by the American Management Association on May 4, 1953, at the Hotel Astor, New York, representatives of five leading companies described their individual reports systems, each emphasizing a particular phase of the reporting problem.

These five presentations now have been adapted and published by the AMA as a 117-page, paperbound book, under the title *Reports to Top Management*. The volume contains "Motivating Executive Action through Reports," by James F. Lillis, Burroughs Corp.; "Obtaining Proper Dissemination of Reports," by Fred F. Hoyt, Carrier Corp.; "Reporting in a Control Group Organization," by Thomas J. McGinnis, Koppers Co.; and "Building an Integrated Reports System: An Outline," by George E. Altmansberger, Ford Motor Co. All but the last include an appendix which contains typical reports.

Copies of the booklet are available from the AMA, 330 West 42nd St., New York 36, for $3.75 each.

OBITUARY

RAY H. MOORE, 61, consulting engineer, Claude B. Schneible Co., Detroit, died Nov. 2. Mr. Moore joined the company in 1949 following

RAY H. MOORE

15 years with National Engineering Co., Chicago. Previously he was associated with W. W. Sly Mfg. Co., Cleveland, American Wheelabrator & Equipment Corp., Mishawaka, Ind., and Whiting Corp., Harvey, Ill. Mr. Moore was the author of a series of articles describing how the Studebaker Corp. modernized its gray iron foundry, which appeared in FOUNDRY, August through November, 1951.

* * *

James B. Arterburn, 73, for the past 10 years associated with Weir Machine & Foundry Co., Plano, Ill., died Sept. 29. Mr. Arterburn began his apprenticeship in Danville, Ill., at the age of 16, supplementing his work in the foundry with enrollment in the David McLain System, correspondence course in foundry practice. He owned his own foundry until 1943 when it was destroyed by fire.

* * *

W. Earle Shumway, since 1950 manager of sales engineering, Norton Co., Worcester, Mass., died Oct. 25. Mr. Shumway joined the research laboratories of the company in 1917, became a sales engineer and served as district manager in Hartford, Conn., and Chicago and later was sales manager of the company's western region.

* * *

Dr. Eugen Piwowarsky, professor of ferrous metallurgy, and director of the Foundry Institute of the Rhein, Westfall Technical High School, Aachen, Germany, died Oct. 17. Dr. Piwowarsky was identified with metallurgical development in Germany for many years, with particular attention to research into methods an processes for manufacture of highe grades of cast iron.

* * *

Orin C. Rogers, assistant to the re gional director of the United State Department of Commerce, died i Cleveland Oct. 20. Mr. Rogers wa with the War Production Board i Cleveland during World War I Among other activities during tha period he directed the drive for scra metals for essential war industries.

* * *

Joseph R. Gould, 63, founder an president, Springfield Bronze & Alu minum Co., Springfield, Mo., died Oc 15. Mr. Gould was graduated fro Massachusetts Institute of Techno ogy and founded the company in 192 He retired in 1944 but returned a company president in August.

* * *

James C. Nevenhoven Sr., 42, s perintendent of the coreroom an shell molding, Brillion Iron Work Inc., Brillion, Wis., died Oct. 26. M Nevenhoven, a foundryman 24 year previously was associated with Cate pillar Tractor Co., Peoria, Ill., an Stover Mfg. Co., Freeport, Ill.

* * *

William F. McKee, 51, foundry e gineer, Dodge Steel Co., Philadelphi died Oct. 16. Mr. McKee previous had been associated with Stockha Valve & Fittings Inc., Birminghan Symington-Gould Corp., Depew, Y., and the Key Co., East St. Lou Ill.

* * *

David E. Shannon, 68, former ge eral manager, personnel manager a secretary-treasurer, Fort Pitt M leable Iron Division of Steel Tradi Corp., McKees Rocks, Pa., died Oct Mr. Shannon retired in 1950.

* * *

George H. Lind, vice president charge of the foundry, Brost Patte & Casting Co., Cleveland, died A 28. Mr. Lind had been with the co pany 17 years.

* * *

William Corzilius, 71, foreman, F eral Malleable Co., Milwaukee, d Oct. 12. Mr. Corziluis had been w the company 48 years and had b foreman 45 years.

* * *

Herbert D. Tietz, 55, manager sales, nickel alloys department, I ternational Nickel Co., New Yo died Oct. 11. Mr. Tietz had been sociated with the company since 19

* * *

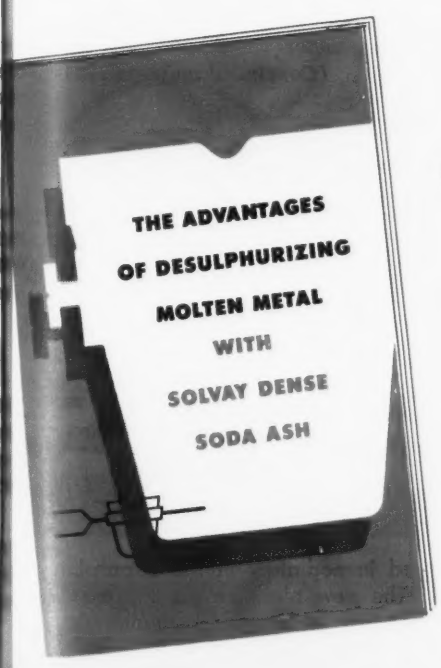
Leo D. Weast, instructor in foun practice, Department of General E gineering, Purdue University, La ette, Ind., died recently.

Desulphurization with SOLVAY DENSE SODA ASH

✔ Offers Many Advantages

✔ Costs Less

SOLVAY DENSE SODA ASH is especially effective for desulphurization. This 100% active material helps produce better, more fluid metal . . . and gives you these other advantages: it's free-flowing; the small grains melt very rapidly, allowing faster, more uniform dispersion; and it's easily added by means of simple equipment. The use of Solvay Dense Soda Ash is a flexible one—you use only as much as you need. And remember, Solvay Dense Soda Ash is the *low cost* form of desulphurization!



Further Information Contained in Valuable Book—Available on Request

"The Advantages of Desulphurizing Molten Metal with Solvay Dense Soda Ash" has been published by Solvay for the benefit of the foundryman. It contains important information on the advantages you can gain by desulphurizing with Solvay Dense Soda Ash. It also explains what type of equipment is needed and how to obtain it. This book is available free—on request—by simply writing to Dept. F12, Be sure to get your copy.

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit • Houston
New Orleans • New York • Philadelphia • Pittsburgh • St. Louis • Syracuse

Soda Ash · Caustic Soda · Potassium Carbonate · Calcium Chloride · Chlorine
Caustic Potash · Cleaning Compounds · Ammonium Bicarbonate · Sodium Nitrite
Sodium Bicarbonate · Snowflake Crystals · Para-dichlorobenzene · Monochlorobenzene
Ortho-dichlorobenzene · Ammonium Chloride

SOLVAY

Industry Briefs

WAUNAKEE Casting Corp. has been formed in Waunakee, Wis., with an authorized capital of 6000 shares of common stock. The corporation will manufacture and sell carbon and alloy steel castings. Incorporation papers were signed by Leo J. Adler, Michael F. Simon and Earl L. Cooper. Registered agent is Mr. Adler, whose address is 102 South St., Waunakee.

* * *

Vanadium Corp. of America has begun production of very-low-carbon ferrochromium at its Graham, W. Va., plant, using a process developed by Societé d'Electrochimie d'Ugine of France. In order to manufacture the alloy, Vanadium Corp. built a $3½ million addition to its $8 million alloy plant at Graham.

* * *

Borden Co.'s Chemical Division has concentrated its general research facilities in a new laboratory in Philadelphia which went into operation Oct. 26 and will augment the division's present development and applications laboratories on the East and West coasts. Research will be undertaken in a wide range of basic problems.

* * *

Quaker Rubber Corp., Division of H. K. Porter Co., Philadelphia, has established a factory warehouse and sales office at 4384 East Bandini Blvd., Los Angeles. The new branch is under the supervision of James Joyner.

Albion Malleable Iron Co., Albion, Mich., is installing an entirely self-contained semiautomatic molding unit designed to put out small castings at a very high rate of production. Molds will be stacked upon each other in a "Christmas tree" arrangement. They will be blown, like sand cores, and then squeezed automatically. Albion also is rebuilding an annealing oven and erecting two new gas fired draw furnaces in the finishing department.

* * *

Dayton Oil Co., Dayton, O., is expanding its chemical materials production and is opening an eastern office at Suite 2745, Graybar Bldg., 420 Lexington Ave., New York 17. Dan D. Downes has been appointed branch manager in charge of sales for the firm's chemical specialties.

* * *

An estimated 20,000 persons toured the 200-acre Phillipsburg, N. J., plant of Ingersoll-Rand Co. on Oct. 25, marking the golden jubilee of the construction of the plant. Hundreds of others crowded the firm's smaller plant in nearby West Easton, Pa.

* * *

Holmes Foundry Co., Sarnia, Ont., has awarded a contract for the erection of a $1 million plant addition.

* * *

Leschen Wire Rope Division, H. K. Porter Co., St. Louis, has established a new sales district covering Texas, Louisiana and Oklahoma. It has headquarters in Houston, Tex., and will be managed by F. E. Suder.

* * *

Reichhold Chemicals Inc., 630 Fifth Ave., New York, is undertaking a $10 million over-all expansion program. It calls for the improvement and enlargement of production facilities in all 12 of the company's domestic plants, with the aim of producing basic chemicals such as phenol, maleic and phthalic anhydride, formaldehyde and pentaerythritol, and selling them to industry.

* * *

Benjamin Harris & Co., Chicago Heights, Ill., has appointed Milton A. Meier Co., 541 New Center Bldg., Detroit, district sales representative for the sale of brass and bronze ingot. The area will be served by direct shipment from the Harris plant at Chicago Heights and from warehouse stocks maintained in Detroit and Grand Rapids.

* * *

Lintern-Jolene Sales Corp., Painesville, O., has appointed the George Q. MacNamara Co., 3305 West Lafayette, Detroit 16, to be Michigan agent for its products, which include crane cab and pulpit air conditioning units, safety and signal lanterns and traction sanders for overhead cranes.

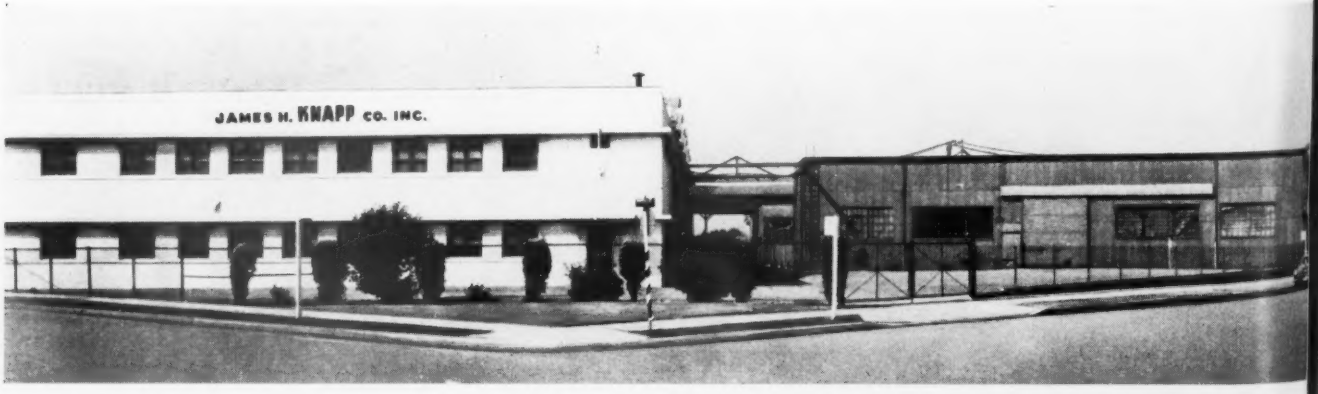
* * *

Cleco Pneumatic Tool Division of Reed Roller Bit Co., Houston, Tex., has appointed J. Schlank Co., Harrison, N. J., and Allied Equipment & Supply Co., Bayonne, N. J., to handle its air tools and related products in New Jersey.

* * *

Hewitt - Robins Inc., Stamford, Conn., has concluded an agreement with Coleman-Wallwork Ltd., London, under which Coleman-Wallwork

(*Concluded on page* 175)



KNAPP CO. MOVES: James H. Knapp Co., West Coast designer and manufacturer of industrial furnaces, has moved into a new plant at 1731 Workman St., Los Angeles 31. Some 151,000 sq ft of the new location will be used immediately in the expansion by the company. The new plant covers 3½ acres. Above are the general offices and engineering building and number one of a total of three shops

Thinking of You

Your appreciation of Famous Cornell Fluxes, the dependable metal purifiers, shown by repeat orders for many years, is most gratifying and we thank you very much.

To all, we wish a holiday season full to the brim with happiness.

Sec'y-Treas.

The CLEVELAND FLUX Co.

1026-1040 Main Ave. N. W., Cleveland 13, Ohio

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze and Aluminum Fluxes, Since 1918.

1918 - 1953

ALLIS-CHALMERS MANUFACTURING COMPANY

PURCHASE ORDER

Mack-Kobinator Corporation

THE OLIVER CORPORATION

KOHLER CO

The Cleveland Flux Company
1026-1034 Main Avenue
Cleveland 13, Ohio

1 Car (50 Tons) Cornell Iron Cupola Flux

J. I. CASE COMPANY
ROCK ISLAND WORKS, ROCK ISLAND, ILLINOIS

INTERNATIONAL HARVESTER COMPANY
MEMPHIS, TENNESSEE

INTERNATIONAL HARVESTER COMPANY
MEMPHIS WORKS
OLD BENJESTOWN & MILLINGTON RD.
P. O. BOX 268 MEMPHIS 1, TENNESSEE

CLEVELAND FLUX COMPANY
1026 MAIN ST. N. W.
CLEVELAND, OHIO

NOTICE. This order is given and accepted subject to all conditions and instructions herein and printed on the reverse side hereof.

CARLOAD CORNELL FLUX

FAMOUS CORNELL FLUXES
Trade Mark Registered

TOUSEY

producers of fine finishes

Uniformity in quality and color is a most important operation in the manufacture of fine finishes at Tousey. No economy is allowed to take the place of accuracy. There is no "near enough" or "almost right." Strict adherence to high manufacturing standards is a must. For more than 69 years Tousey's policy has been to install the newest and most accurate equipment for the creating of fine finishes. . . . Laboratories, production lines, storage facilities, all are kept at top peak efficiency at all times. For the finest paints, varnishes, lacquers or synthetics specify Tousey finishes.

TOUSEY VARNISH COMPANY

520 W. 25th Street Chicago 16, Illinois

(*Concluded from page* 172)

will manufacture vibrating equipment for foundries and shakers for railroad cars to Hewitt-Robins specifications. Coleman-Wallwork will have distribution rights in the British Isles, North Ireland, South Africa, India, Australia and New Zealand.

* * *

Metropolitan Refractories Corp. has moved its office from New York to its warehouse, Tomkins Tidewater Terminal, Kearny, N. J. The company will continue to maintain a warehouse at 192 King St., Brooklyn, N. Y., and at 95 Champlain St., Albany, N. Y.

* * *

Refractory Products Co., 910 Custer Ave., Evanston, Ill., has been made execlusive sales agent in Michigan, Illinois and Wisconsin for aluminum alloys made by the Wabash Smelting Co., Wabash, Ind.

* * *

Omni Products Corp., 460 Fourth Ave., New York 16, is handling export sales of shell molding machines manufactured by Shell Process Inc., McKinstry Ave., Chicopee, Mass.

* * *

Enterprise Brass & Iron Foundry Inc., South Ave., Lewiston, Me., was destroyed by fire Oct. 15, with estimated loss of $100,000. Cyrille Legendre is owner.

* * *

Southern Casting Co. is the new name of the former Pigeon Forge Foundry, Sevierville, Tenn., manufacturer of aluminum and bronze castings.

* * *

Aluminum Alloys Co. recently opened a permanent mold casting plant at 2112 West Rice St., Chicago 22. Louis M. Wick, is president.

* * *

H. P. Deuscher Co., Seventh & Hanover Sts., Hamilton, O., has been licensed by International Nickel Co., New York, to produce nodular iron.

Recruiting College Men

As an aid to companies interested in hiring college graduates, American Management Association, 330 West 42nd St., New York 36, has published a booklet entitled "Recruiting the College Graduate: A Guide for Company Interviewers." Written by Richard S. Uhrbrock, head of the research department, industrial relations division, Proctor & Gamble Co., the volume analyzes interview objectives and techniques with the aim of establishing how to find and interest the best men available. Cost is $1.25.

Operate Mobile Foundry

(*Concluded from page* 113)

neer (Depot Maintenance) Co. 2nd Lt. Robin R. Forsberg is foundry officer, Sgt. First Class James D. Farmer is foundry foreman, and John H. Williams is civilian advisor. Other personnel of the unit are as follows: Pattern foreman, Sgt. Elmer R. Peterson; patternmaker, Pvt. Paul A. Diciccio; molder foreman, Sgt. William H. Martin; molders, Pfc. Ted Schroeder, Pfc. Robert Netherton, Pfc. Melvold A. Blitchfield, Cpl. Robert L. Goetz, Cpl. Mike McClain; furnace operator, Cpl. Earl Z. Fairchild; coremaker, Sgt. George L. Nolan; and finisher, Pvt. Austun J. Walters Jr.

Civilian advisor John H. Williams has had considerable foundry experience, beginning with the Bristol Iron & Steel Works and the Enterprise Wheel & Car Corp., Bristol, Va., and including connections with the International Harvester Co., Richmond, Ind., John Deere Harvester Works, East Moline, Ill., and the Washington Navy Yard, Washington.

Sgt. George L. Nolan, in charge of coremaking at the unit, recently returned from Korea, where he had an interesting job in producing castings for the railroads. Because he had had previous experience as a coremaker at the John Deere Tractor Co., Waterloo, Iowa, Sgt. Nolan was given charge of about 150 South Koreans at the foundry of the Transportation Railroad Shop of the Korean National Railway in Pusan. The principal work produced there was brake shoes. The foundry had two 38-in. cupolas, two 250-lb nonferrous furnaces, and one small electric furnace. The foundry had one jolt-squeeze machine, but it was not in working order. The shop produced from 200 to 250 tons of iron castings and from 40 to 60 tons of nonferrous castings a month.

Sgt. Nolan reports that the biggest problem developed in connection with supplies. The shop normally used anthracite coal for cupola melting, but as that was not available during the war, local coke was used. This was so high in sulphur that a great amount of difficulty was encountered. The sulphur got so high that it was not possible to remelt gates and sprues. Sand was good, but binders were not adequate. The brake shoes had a steel plate cast in the back, and since the mold were made one day and poured the next, considerable difficulty was encountered. Regardless of the problems constantly facing the army-operated foundry, Sgt. Nolan likes the work and plans on staying in the service and continuing to work in the foundry units.

Aluminum Smelters Change Name of Association

Aluminum Research Institute has changed its name to Aluminum Smelters Research Institute. Purpose of the change is to indicate more clearly the scope of the organization, which for 24 years has been the trade association of the aluminum smelting industry. There will be no change in setup or objectives of the group.

MAGNET PRODUCTION RISES: Production of small, U-type Alnico magnets at Indiana Steel Products Co., Valparaiso, Ind., has been boosted 200 per cent by the use of a Besly vertical spindle wet type grinder which incorporates an automatic clamping feature. Production of the magnets on these grinders is about 500 pieces an hour, and fast operators can turn out as many as 800 per hour. Magnet castings are loaded on a 48-in.-diam rotary feed wheel, automatically clamped in place and revolved beneath a 36-in.-diam resinoid bonded grinding wheel. One side is ground, the magnet is turned manually, and the second face is ground

Around the Country

NEWS REPORTS FROM

New York
Philadelphia
Chicago
Los Angeles
Detroit

MOST casting consumers are trying to run the year out without adding any more to their inventories than is absolutely necessary. There is no longer much concern about being able to get casting shipments promptly, or at least without undue delay. Nor is there any great pressure from buyers of products into which castings figure. Consequently, with the year-end near at hand there is the general disposition to coast along on existing inventories.

Most casting makers do not look for any particular spurt with the turn of the year. In fact, they say, "spurt" is not quite the word; rather, the prospect may better be described as a return to more normal ordering.

Currently, gray iron shops are operating at around four to five days a week, although not with full operating forces. Backlogs are not more than three weeks in most cases, with the average even less. However, the fact that iron foundries can go along at four to five days indicates that business is not too flat. There is a fairly consistent volume of business from various sources, such as manufacturers of driving motors, control equipment, gears, and so forth. Pipe requirements are off seasonally, also home heating equipment, among other applications. But in no sense has the bottom dropped out in any important line of consumption.

Malleable shops are operating at 70 per cent of normal, with delivery promises ranging around three to four weeks. Although they are using reduced forces, they are able to maintain schedules running four to five days a week. The tapering off in automotive and agricultural equipment demand is nevertheless being felt. Also freight car building is dragging, with little improvement anticipated in this direction before early spring. Demand for pipe fittings, a bread and butter item in many malleable shops, continues steady.

Steel casting shops have reduced their shifts and have cut their forces, with a result that they are turning out 70 per cent of the tonnage being shipped early in the year. Decline in defense work, especially with regard to tanks, has been a major factor. Most steel foundries have reasonably good backlogs, averaging six to seven weeks.

Business is rather quiet with brass and bronze shops. Some of the larger foundries are still engaged in a fair amount of defense work, involving special alloys and close specifications. That the small shops do not have more of this work is ascribed simply to the fact that they are not set up to handle it. Aluminum and magnesium shops are busy, mainly with aircraft requirements.

COMPETITION among foundrymen is keen, with price and delivery increasingly dominating factors. No little competition is coming from outside shops, where labor costs are cheaper, thus creating a special problem.

Most gray iron foundries are operating around four days a week, some as much as five, although with somewhat reduced working forces. But in no case does any shop appear to be working up a backlog. Backlogs at most are not running more than three weeks and in the majority of cases not more than two.

Some lines, gray iron founders declare, are holding up fairly well. These include special machinery, as differentiated from standard machine tools, and building needs, such as electrical fittings, railing and hardware. However, the overall situation is not good, and most trade leaders doubt if there will be much improvement before the turn of the year, and are not too sure as to how much improvement to expect after that.

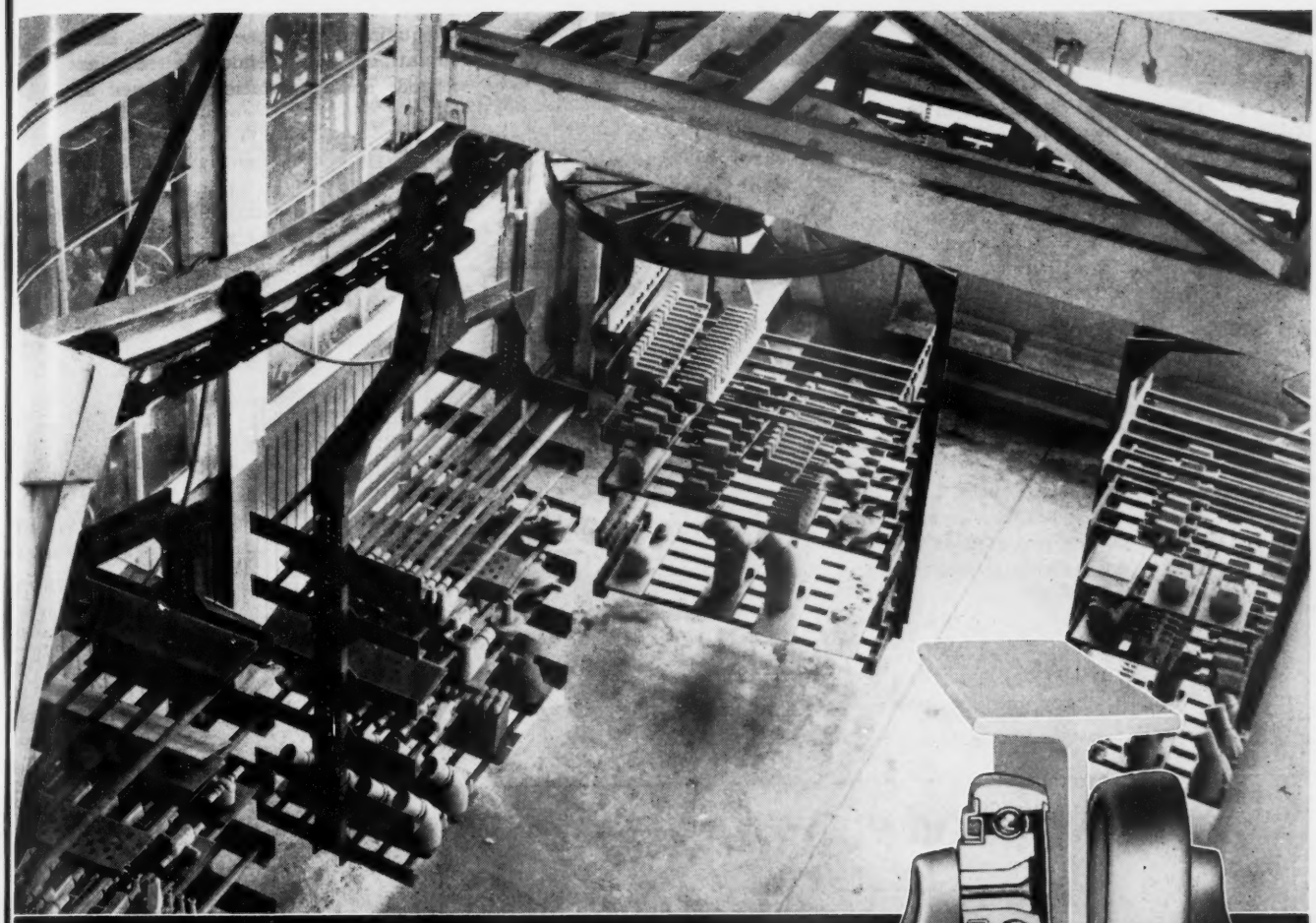
At the same time, there is no doubt but what consumer inventories in general are at the lowest levels they have been in a long time. This is reflected by the number of requests for quick deliveries. Some time before too long, it is believed, some casting consumers at least will have to start building up their stocks. Let there be a general stiffening in deliveries and replacements may be stepped up fairly rapidly.

Steel foundries are not operating at a much better pace than gray iron foundries, although they have more on hand in the way of backlogs. Delivery promises appear to average around six weeks. This reflects a sharp drop from earlier in the year, although a reasonable leveling off over recent weeks. Malleable shops are just about holding their own. Operations are around four to five days a week and backlogs around four weeks. Business with the small brass and bronze shops is definitely on the quiet side and most of the larger shops are not doing too much better. It is a rather spotty and confused situation all around. Brass and bronze founders, however, doubt if there will be much change over the remainder of this year.

A RELATIVELY weak condition persists in Detroit area foundries. Automotive operations in many instances still are cut back because of high inventories of castings and slackened production, while jobbing foundries report a business drought for much the same reasons. A pattern of three to five day operation on single shifts persists in most foundries, with some upturn expected as new model introduction perks up demand, and shutdowns for model changeover end.

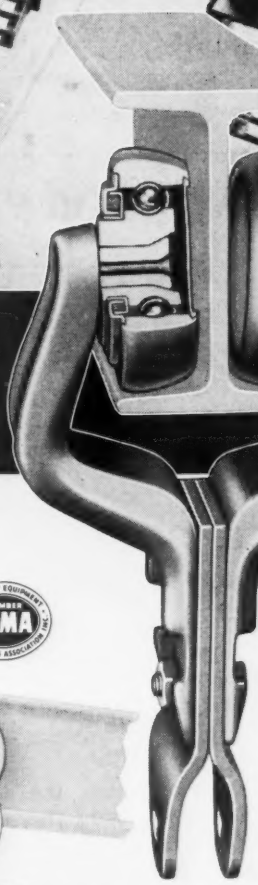
Last month at the Society of Automotive Engineers production forum in Toronto, Canada, several phases of automotive foundry operation were discussed and might be of in-

(*Concluded on page* 178)



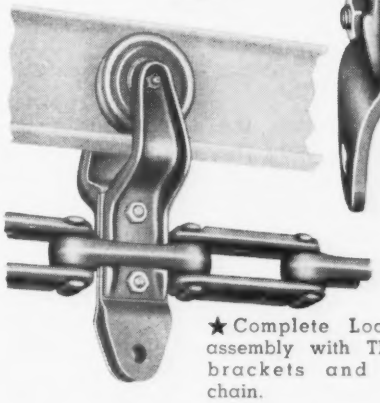
meet the bright new MATHEWS LOADSTAR

a spectacular performer in the fine trolley field



★ No. 4207J Loadstar wheel, cutaway showing felt and steel seal.

★ Here is a completely new trolley conveyer designed to meet the requirements of the most exacting purchaser. A top-quality precision wheel, the No. 4207 Loadstar is the heart of this rugged newcomer to the 4" trolley conveyer field. Five years of research and development by Mathews Engineers are behind this exceptionally fine trolley which is recommended for the overhead conveying job demanding stamina and continuous, trouble-free performance. Write for Bulletin LS-1, announcing and describing this new trolley.



★ Complete Loadstar assembly with TB-4351 brackets and X-458 chain.

MATHEWS CONVEYERS

GENERAL OFFICES *Mathews Conveyer Company* . . . . **Ellwood City, Pennsylvania**
PACIFIC COAST DIVISION *Mathews Conveyer Company West Coast* . . **San Carlos, California**
CANADIAN DIVISION *Mathews Conveyer Company, Ltd.* . . . . . **Port Hope, Ontario**

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

(*Concluded from page* 176)

terest here. Canadian foundrymen consider one of their top problems to be the co-ordination of design engineer efforts with foundrymen's know-how, and believe that panel meetings should be held during the drawing stage of part development as well as in the latter stages so that both points of view may be dovetailed adequately.

Shell molding is regarded as a very young process with many bugs still to be overcome, but in general the improved finishes and closer tolerances which may be held promise to lower the cost of many foundry products. One of the most important implications they feel, is the fact that conventional foundry practice is being put back on its toes to obtain the ultimate and meet the shell-molding threat where it is a threat. Many, they feel, have been content to offer less than the full potential of conventional foundry product quality.

Nodular iron also was discussed and it was the opinion that although properties of the material approximate those of steel for some applications, in the over-all picture it constitutes no threat to steel as a volume material.

INTERNATIONAL Harvester Co. currently is conducting a series of "vendor's day" programs at its Milwaukee Works. It is believed to be the first such type of program in that area and contemplates about ten sessions—one each week starting Nov. 10. That many will be required to entertain two representatives from each of approximately 250 Wisconsin businesses which supply the works. From 40 to 50 guests will gather at the plant each week.

Through this program, according to John E. Obernesser, works manager, the hope is to become better acquainted with the suppliers. Since relations with vendors already are good, an appreciation for their assistance will be demonstrated.

Milwaukee Works annually spends about $4.25 million with these suppliers, while International Harvester as a whole annually purchases supplies worth about $34 million in Wisconsin. Castings are one of the important items bought. Other purchases include special oils, cutting tools, machine tools, forgings, lumber, fabricated parts and steel from warehouses.

The weekly programs will be informal. Invitations are sent to two persons of each of the 250 firms—the sales representative who services the Milwaukee Works account and the operating head of his organization in Wisconsin.

FOUNDRYMEN generally are satisfied with the current level of activity. Usually, the last quarter is one of seasonable slowness in foundry business, but October was a good month, some foundries registering gains ranging from 10 to 15 per cent.

Even nonferrous foundries, despite some cause for pessimism from increasing competition and price shading, were more active. Jobbing business of ferrous foundries is holding up well, some shops in October showing a 10 per cent increase over September. Generally 1953 may be a better year than 1952. Iron foundry sales are running 15 per cent ahead of last year but backlogs in most cases are down.

Some foundrymen say that a backlog is a thing of the past because casting buyers are not ordering as far in advance as they once did. Currently, buyers specify close to their requirements—about 30-60 days—compared with 60-90 days previously. A few customers schedule two to three months ahead. With such a small cushion, line shortages develop so that frequently customers require quicker service—and they get it.

There is some discussion in the trade concerning the level of casting prices. Foundrymen generally concede that ferrous casting prices will increase with rising labor rates. Nonferrous casting prices are down currently since the market is increasingly competitive, so it is not considered likely that these prices will rise. AFL foundry workers so far this year have received increases totaling about 20 per cent. CIO contracts are scheduled to be reopened in January and the expectation is that union demands will be in line with AFL settlements.

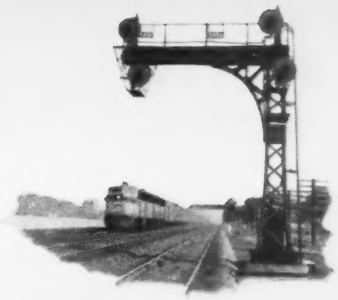
Hold FEF Meeting at Missouri School of Mines

THE Missouri School of Mines industrial advisory committee of the Foundry Educational Foundation, under the chairmanship of A. L. Hunt, American Brake Shoe Co., met on Sept. 24 with faculty members on the campus at Rolla, Mo., where the view above was taken. Purpose of the meeting was to discuss employment opportunities in the foundry industry and the progress of the foundation's program at the school.

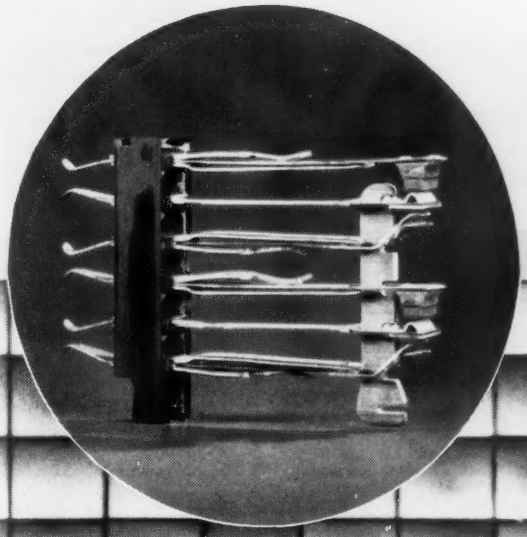
The committee reported substantial progress in foundry development work being conducted in the metallurgy department at the Missouri school and noted that student and faculty interest in the cast metals program is at a high level. Edward Walsh, Cleveland, FEF executive director, discussed progress of the foundation's program and indicated that industry is depending on the engineering schools participating in this program to supply it with manpower for the coming year, during which the FEF will again provide funds to be used for foundry scholarships at Missouri School of Mines.

Dean Wilson anounced that the following men had been awarded FEF scholarships for the fall semester of the 1953-54 school year: Donald R. Bogue and Alan B. Burgess, Normandy, Mo.; Sidney J. Cole, Chicago; Larry L. Gidley, Bonne Terre, Mo.; David S. Gould, Decatur, Ill.; Walter W. Grueninger and Ralph L. Hollocher, St. Louis; Jack H. Humphrey, Berwyn, Ill.; Louis G. Jones, Rolla, Mo.; Anthony J. Selvaggi, Essex, N. J., and Milton J. Smid, Affton, Mo.

These relay contacts



spell train safety—



Relay contact assembly showing silver-carbon contacts.

Radiograph discloses contacts with improper silver dispersion.

RADIOGRAPHY gives them the "Green Light"

RELAY CONTACTS for railway signals must have low resistance. Ideally, this would call for silver touching silver—but pure silver contacts might fuse if overloaded and the signal lock on green. Carbon contacts can avoid this but have too high resistance.

The answer lies in impregnating carbon with silver, then making sure by radiography that the silver grains are properly dispersed throughout the carbon. This provides assurance that the relay will have a non-fusing contact with low resistance.

It's another example of how radiography can prove internal soundness, whether in such a compound as this, in a casting, or a weld.

Radiography is improving products and production in many kinds of operations. To learn how it can help you, see your x-ray dealer.

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography...

another important function of photography

Kodak
TRADE MARK

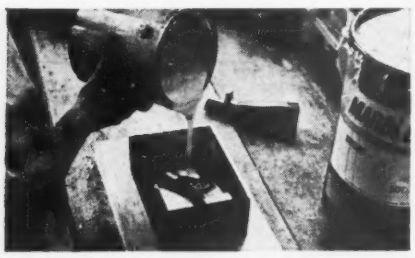
MARBLETTE RESIN #71

MASTERPIECE

for the MASTER PATTERN MAKER

In these few, simple steps pictured below, the modern pattern maker duplicates costly master patterns, match plate parts and commercial models; gets improved molds, lowers construction and maintenance costs, reduces mold damage . . . in a word, makes this modern resin, Marblette Resin #71, one of his finest, most economical new tools.

Write today for the *Marblette Manual for Phenolic Casting Resins*—a manual for the modern pattern maker. The Marblette Corporation, Long Island City 1, N. Y.

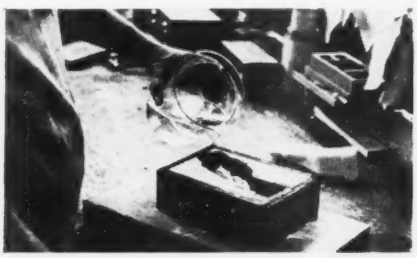


Carefully proportioned water and Plaster of Paris mixture being poured over the pattern. Flat edges of frame prevent leaking underneath.

After plaster has set just enough to retain its form, the pattern is carefully withdrawn, avoiding warping or swelling.

After sufficient drying time, the plaster mold is painted with a plastic paint to help seal porosities and ease extraction of cured pattern.

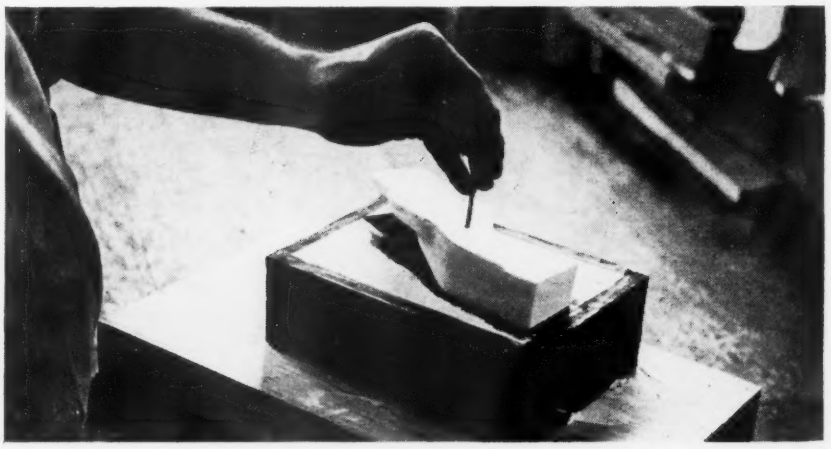
Adding the proper amount of acid hardener to the liquid resin #71 insures optimum physical properties of master pattern duplicate.

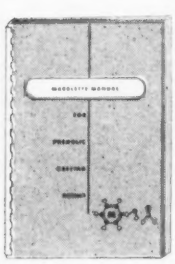


Resin-hardener mix is poured into pre-warmed mold. Prewarming lessens the time needed to cure resin in oven.

Mold filled with resin is carefully placed in oven. Small patterns will cure in about an hour at 180°F.

Final extraction of cast duplicate takes place after mold has thoroughly cooled. A wood screw eye will aid in extraction.





25th ANNIVERSARY the marblette corporation

Since 1929 liquid and cast phenolic resins

Marblette

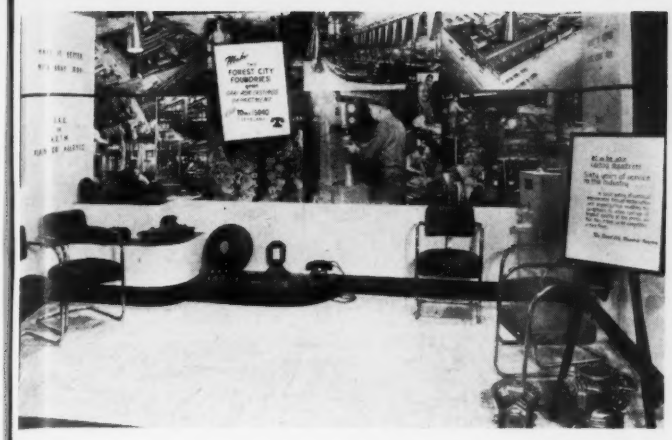
▲ FREE! *90 page book*

Write today for your copy of the Marblette Manual for Phenolic Casting Resins.

37-09 30th St., Long Island City 1, N. Y. Tel: STillwell 4-8100

CHICAGO • LOS ANGELES • HAVANA

liquid phenolic resins Casting resins for dies and tools · Heat and acid resistant resins · Bonding resins · Metal coating Insulating varnish · Bristle setting cement · Laminating varnish · Wood coating · Plastic cements · Sealing resins · Resin foundry core binders



Many Foundries Exhibit Wares at Metal Congress and Exposition

WITH an estimated 50,000 studying the displays of over 450 exhibitors and participating in the various technical sessions, the 35th national Metal Congress and Exposition was one of the best ever. Held at the Public Auditorium, Cleveland, on Oct. 17 to 23, the congress was jointly sponsored by the American Society for Metals, American Welding Society, Institute of Metals Division of American Institute of Mining and Metallurgical Engineers, and the Society for Non-Destructive Testing.

At the annual meeting held on Wednesday the newly elected officers of ASM were presented. They are: President, James B. Austin, U. S. Steel Corp., Kearny, N. J.; vice president, G. A. Roberts, Vanadium Alloys Steel Co., Latrobe, Pa.; treasurer, W. A. Pennington, Carrier Corp., Syracuse, N. Y. Newly elected trustees include G. M. Young, Aluminum Co. of Canada Ltd., Montreal, and Robert Raudebaugh, Georgia Institute of Technology, Atlanta.

The annual Campbell Memorial lecture was presented by Donald S. Clark, California Institute of Technology, Pasadena, Calif., on "Behavior of Metals under Dynamic Loading."

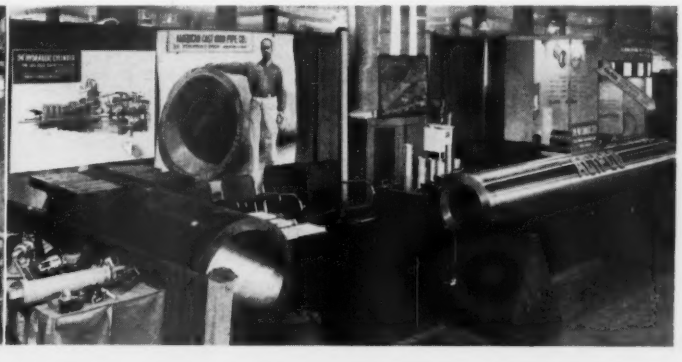
During the annual ASM banquet three awards were made to men distinguished in the field of metals. The Albert Sauveur achievement award was presented to William T. Ennor, Aluminum Research Laboratories, Aluminum Co. of America. The ASM gold metal was given to Dr. George Sachs, Institute of Industrial Research, Syracuse University. ASM medal for advancement of research was presented to Hiland G. Batcheller, Allegheny-Ludlum Steel Corp.

Since a large portion of those attending the Metal Show were consumers or prospective consumers of castings, many foundries aware of marketing possibilities as well as promotion of castings' use had booths in the exhibition hall. Some of the displays are shown in the accompanying illustrations.

Exhibiting foundries included Alloy Engineering & Casting Co., Champaign, Ill.; American Brake Shoe Co., New York; American Cast Iron Pipe Co., Birmingham, Ala.; American Non-Gran Bronze Co., Berwyn, Pa.; American Radiator & Standard Sanitary Corp., Pittsburgh; Ampco Metal Inc., Milwaukee; Arwood Precision Casting Corp., Brooklyn, N. Y.; Austenal Laboratories Inc., New York; Morris Bean & Co., Yellow Springs, O.; Casting Engineers Inc., Chicago; Crucible Steel Co. of America, New York.

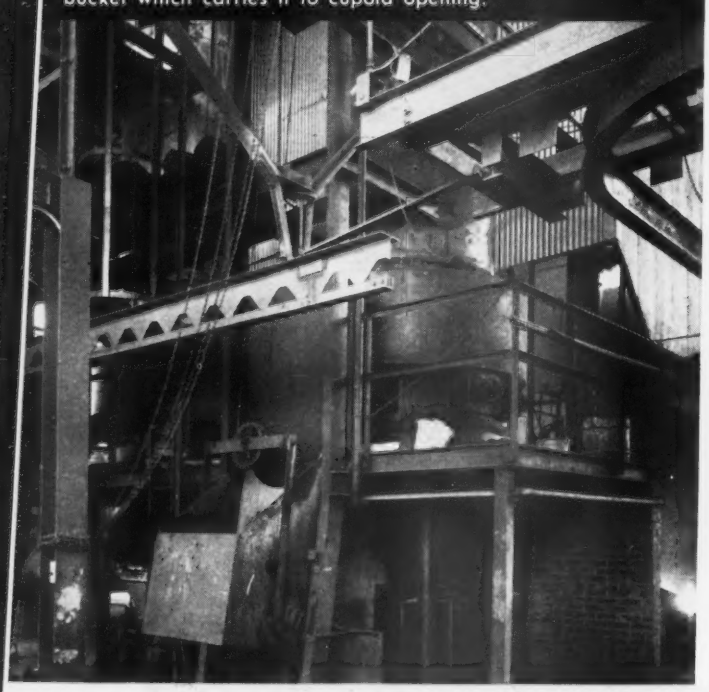
Dow Chemical Co., Midland, Mich.; Engineered Precision Casting Co., Matawan, N. J.; Fahralloy Co., Harvey, Ill.; Forest City Foundries Co., Cleveland; General Alloys Co., Boston; Haynes Stellite Co., New York; Hitchiner Mfg. Co. Inc., West Hartford, Conn.; Howard Foundry Co., Chicago; Janney Cylinder Co., Philadelphia; Lynchburg Foundry Co., Lynchburg, Va.; Michiana Products Corp., Michigan City, Ind.; Misco Corp., Detroit; Ohio Steel Foundry Co., Springfield, O.; Philadelphia Bronze & Brass Co., Philadelphia; Precision Castings Co. Inc., Syracuse, N. Y.; Precision Metalsmiths Inc., Cleveland; Shenango-Penn Mold Co., Dover, O.; Standard Alloy Co. Inc., Cleveland; Universal Castings Corp., Chicago.

A demonstration of shell mold production attracted considerable interest at the booth of Frederic B. Stevens Inc. where an automatic machine built by Sutter Products Co. was operated. Stevens recently was appointed exclusive sales agent for Sutter equipment.



Continuous Melt Increases

Whiting transfer bucket with weigh scale on Whiting Trambeam monorail picks up 1,000 pound charge—transports it to Whiting side dump skip. Charge is then dumped into skip bucket which carries it to cupola opening.



Whiting side dump skip shown returning after delivering charge to cupola opening. Two Whiting No. 5 cupolas are used in alternate daily sequence. This permits maintenance on the idle cupola without interruption of production.

Mechanized Charging and Cupola to Electric Furnace Duplexing Boost Casting Quality and Quantity

Continuous melting, improved efficiency and a 41 per cent gain in capacity! These are results achieved with Whiting equipment at the foundry of Appleton Electric Company, South Milwaukee, Wis., in production of malleable castings for conduit fittings.

A Whiting Hydro-Arc Electric Furnace takes the melt from either of two No. 5 Whiting Cupolas . . . and this duplexing operation provides an uninterrupted flow of metal to supply Appleton's two mechanized pouring lines at peak capacity. Duplexing also assures precise temperature control . . . fine grain, high strength castings in volume with fewer rejections.

Supplying the cupolas is a Whiting Trambeam Monorail Make-up System, including a transfer bucket which takes a 1,000 pound load from the storage bins and moves it quickly to the Whiting side dump skips. The skips lift the charge to the opening in the cupola stack . . . automatic push button operation controls lifting and dumping. Whiting Type W Suppressors on cupola stacks aid in keeping outside air clean.

All this equipment assures more profitable foundry operation . . . savings in time and manpower, benefits that every foundry can use!

WHITING CORPORATION

15607 Lathrop Avenue, Harvey, Illinois

Write — *Get full information on the complete Whiting foundry line!*

WHITING
Engineered
FOUNDRY EQUIPMENT

Whiting Foundry Products Include:

Cupolas • Cupola Spark Suppressors • Cupola Hot Blast Equipment • Cupola Blast Moisture Control Equipment • Cupola Charging Systems • Cupola Coke Igniters • Cradle Furnaces • Converters (Steel) • Duplex Melting Systems • Air Furnaces • Electric Melting Furnaces • Ladles • Ladle Handlers • Tumbling Mills • Annealing Ovens and Cars • Pulverizers • Pulverized Coal Firing Systems • Turntables • Electric Traveling Cranes • Trackmobile • Trambeam Overhead Handling Systems • Electric Chain Hoists.

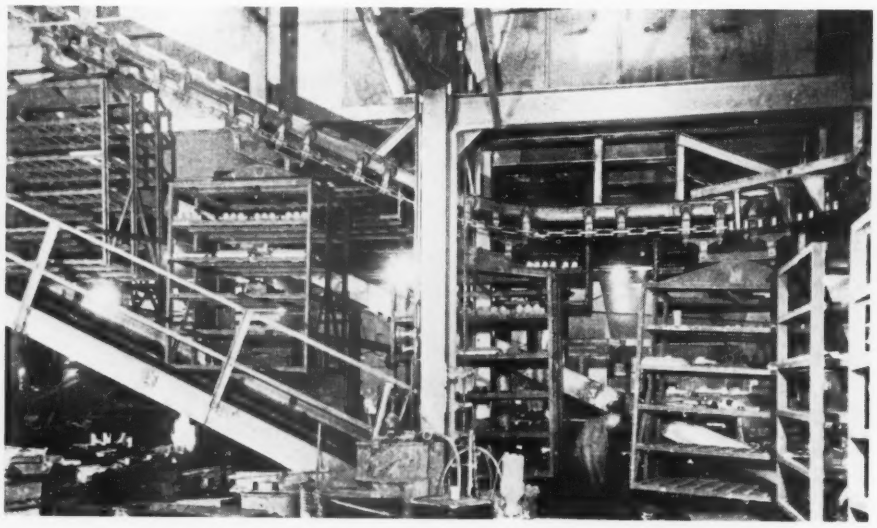
ces production for Appleton!

The melt flows from the cupola (in background), through a de-sulphurizing forehearth into the Whiting Hydro-Arc Electric Furnace (Size 6-M) which provides a continuous supply of metal at 2950° F. for pouring. Overhead system transports ladle to either of two mechanized pouring lines.

Installs Modern Core Baking System

Conveyor racks pass directly in back of the coremaking benches, where they are loaded. The conveyor is moving to the left, toward the oven

Traveling on the continuous conveyor system at a speed of 42 ft per hour, loaded core racks at this point begin to ascend into the oven



When the baking process has been completed and cores have left the oven, the conveyor descends to floor level, where cores are unloaded

"ENOUGH in time" is the constant aim of Riverside Foundry's steel division in carrying out the all important task of defense production. Thus states an editorial in the firm's own house magazine, *Know Riverside*.

Riverside Foundry, Bettendorf, Iowa, is the largest independent steel and gray iron jobbing foundry in the state. Recently its steel division has been busily engaged in producing cast armor steel parts for Army tanks.

To speed up production and to better meet government specifications, Riverside officials decided to modernize its coreroom. The task of designing, building and installing new core baking equipment to meet Riverside's steel core room needs was given to engineers of the Despatch Oven Co., Minneapolis. Working in close collaboration with Riverside engineers, Despatch was able to build and install a continuous conveyor type core baking system with overhead oven that has increased the coremaking capacity of the foundry by 125 per cent. Core breakage has been reduced by the elimination of much manual handling.

Operating 20 hours per day, six days per week, the system uses 210 tons of sand per week. Sand mixes for the various types of cores are varied in color by special dyes for easy identification of the cores. Core racks are carried on a 480-ft-long overhead continuous conveyor traveling at a speed of 42 feet per hour. Passing directly in back of the coremaking benches, the racks are loaded as they proceed to the baking oven.

The core baking oven is an overhead type with bottom entry. It is a two-pass unit, 21 x 60 ft, and also has a core cooling section. The oven is operated at a temperature of 400° F by direct gas-fired heaters, and the baking cycle is three hours.

HERE'S YOUR GUIDE TO IMPROVED SHELL MOLDING WITH BR-12011S

"BAKELITE" SHELL MOLDING RESIN BR-12011S PROVIDES:

- **Faster production of molds**
- **Improved adhesion of resin-sand mixture to pattern plates**
- **Stronger molds that resist distortion upon ejection from pattern plate**

GET THE STORY FROM THIS BULLETIN . . . BAKELITE Shell Molding Resin BR-12011S has been specially developed to give greater latitude in mold-making. It can be subjected to a greater variation in operating conditions than ordinary shell molding resins. Molds made with BR-12011S reach minimum usable strength faster, retain strength longer at curing temperatures, permit more leeway in curing time.

Shell molds made with this resin resist the tendency to distort upon ejection from the hot pattern plate, insuring better mating of mold halves. The molds also offer greater resistance to deformation during the pouring operation, resulting in castings with better dimensional accuracy.

MAIL THE COUPON TODAY

BAKELITE COMPANY, Dept. SS-29
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.

Please send me complete information on shell molding resin BR-12011S, together with the basic story of shell molding with BAKELITE Phenolic Resins.

*Name*_____ *Title*_____

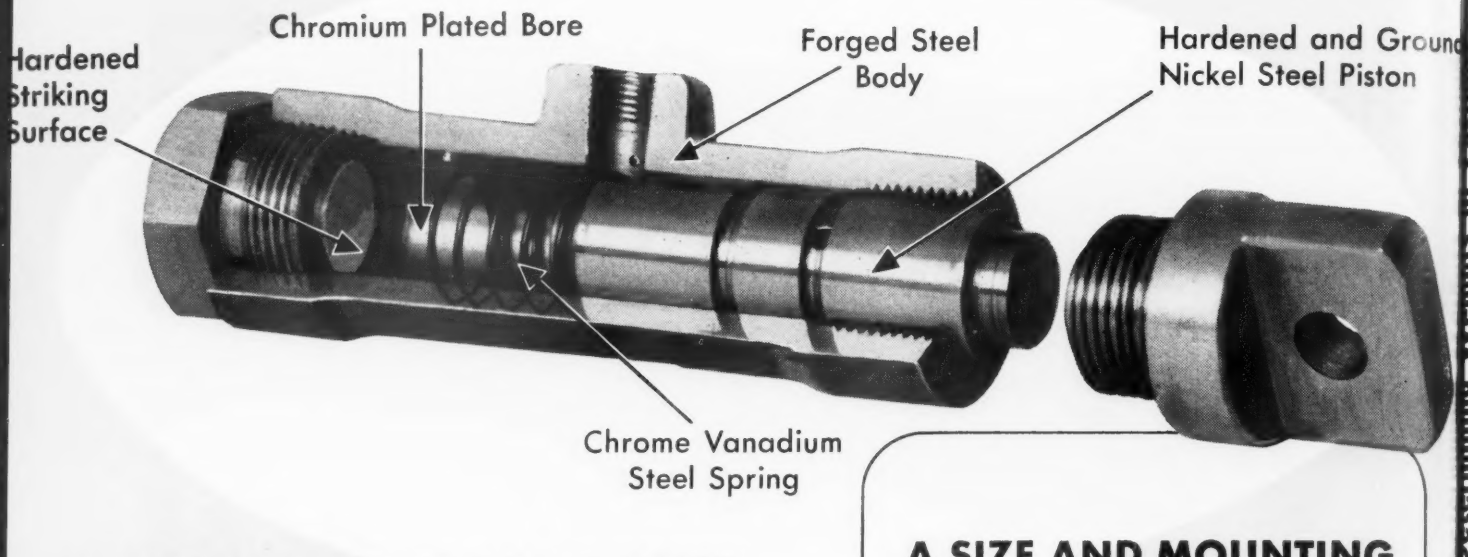
*Company*_____

*Street*_____ *City*_____ *State*_____

BAKELITE
TRADE-MARK
PHENOLIC RESINS FOR SHELL MOLDING

TRADE MARK
BAKELITE COMPANY
A Division of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N.Y.
In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.

OSBORN FOUNDRY VIBRATORS



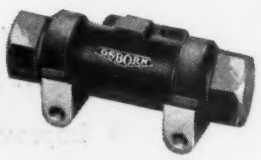
NEW STANDARDS FOR POWER, DEPENDABILITY, ECONOMY

- Greater power in proportion to size.
- Long life with chrome plated bore and hardened pistons.
- Economical on air consumption.
- Greater dependability... more freedom from sticking.

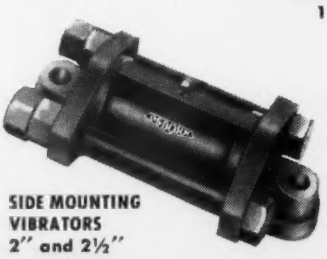
ABSOLUTE vibrator dependability is vital to continuous efficient mold production. To achieve this result, Osborn has developed this improved design to operate hour after hour, day after day under the severest foundry conditions. Built of the finest quality materials and precision workmanship, Osborn's vibrators provide a low cost insurance for maximum molding machine production. Available from Cleveland stock.

A SIZE AND MOUNTING FOR EVERY NEED

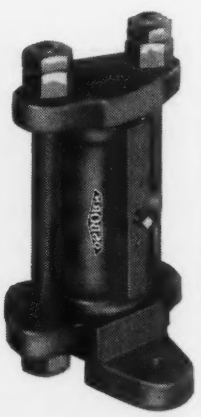
MATCH PLATE VIBRATORS
⅜", ¾" and 1"



SIDE MOUNTING VIBRATORS
1", 1¼" and 1⅝"



SIDE MOUNTING VIBRATORS
2" and 2½"



END MOUNTING VIBRATORS
1¼", 2" and 2½"

ANOTHER EXAMPLE OF OSBORN LEADERSHIP AND ADVANCED ENGINEERING

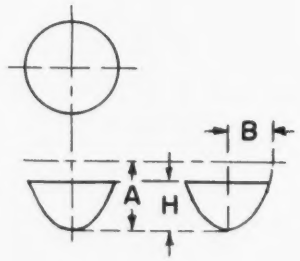
OSBORN

MOLDING MACHINES · CORE BLOWING MACHINES · INDUSTRIAL BRUSHES

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland 14, Ohio

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

(Continued from November)



To find the weight of a segment of an ellipsoid, when the base is parallel to the revolving axis, multiply the difference between three times the fixed semiaxis and the height of the segment, by the square of the height, by the square of the revolving semiaxis, by the value of M (Table XI) and divide by the square of the fixed semiaxis.

$$W = \frac{(3A - H)H^2B^2M}{A^2}$$

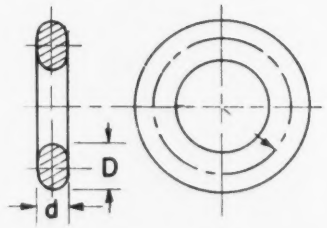
Table XII

Wt. per cu in.	K	M	N	Wt. per cu. in.	K	M	N	Wt. per cu. in.	K	M	N
.096	.474	1.895	.603	.250	1.234	4.935	1.571	.410	2.023	8.093	2.576
.100	.494	1.974	.628	.260	1.283	5.132	1.634	.420	2.073	8.291	2.639
.110	.543	2.171	.691	.270	1.332	5.330	1.696	.430	2.122	8.488	2.702
.120	.592	2.369	.754	.280	1.382	5.527	1.759	.440	2.171	8.685	2.765
.130	.642	2.566	.817	.290	1.431	5.724	1.822	.450	2.221	8.883	2.827
.140	.691	2.764	.880	.300	1.481	5.922	1.885	.460	2.270	9.080	2.890
.150	.740	2.961	.942	.310	1.530	6.119	1.948	.470	2.319	9.277	2.953
.160	.790	3.158	1.005	.320	1.579	6.317	2.011	.480	2.369	9.475	3.016
.170	.839	3.356	1.068	.330	1.629	6.514	2.073	.490	2.418	9.672	3.079
.180	.888	3.553	1.181	.340	1.678	6.711	2.136	.500	2.468	9.870	3.142
.190	.938	3.751	1.194	.350	1.727	6.909	2.199	.510	2.517	10.067	3.204
.200	.987	3.948	1.257	.360	1.777	7.106	2.262	.520	2.566	10.264	3.267
.210	1.036	4.145	1.319	.370	1.826	7.304	2.325	.530	2.616	10.462	3.330
.220	1.086	4.343	1.382	.380	1.875	7.501	2.388	.540	2.665	10.659	3.393
.230	1.135	4.540	1.445	.390	1.925	7.698	2.450	.550	2.714	10.857	3.456
.240	1.184	4.737	1.508	.400	1.974	7.896	2.513	.560	2.764	11.054	3.519

Interpolation Table

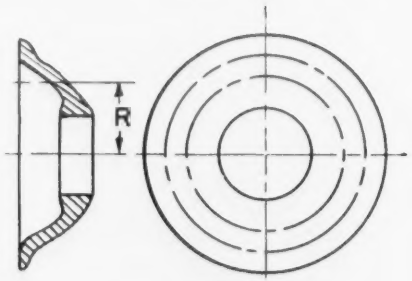
Add'l. Wt.	Add'l. K	Add'l. M	Add'l. N	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. N	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. N
.001	.005	.020	.007	.004	.020	.079	.025	.007	.035	.130	.044
.002	.010	.039	.013	.005	.025	.099	.031	.008	.039	.158	.050
.003	.015	.059	.019	.006	.030	.113	.033	.009	.044	.178	.057

For method of interpolation see Table II. (July issue page 150)



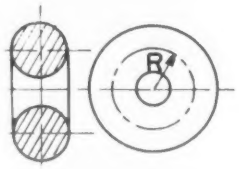
To find the weight of a ring of elliptical cross-section, multiply the radius of the circle passing through the center of the cross-section, by the large diameter of the ellipse, by the small diameter, by the value of the constant K, (Table XII) corresponding to the weight per cubic inch of material used.

$$W = RDdK$$



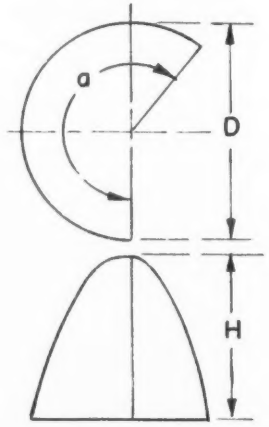
To find the weight of a solid generated by revolving a plane area about an axis multiply the area by the distance from the center of gravity of cross-section to the axis by the value of N (Table XII).

$$W = ARN$$



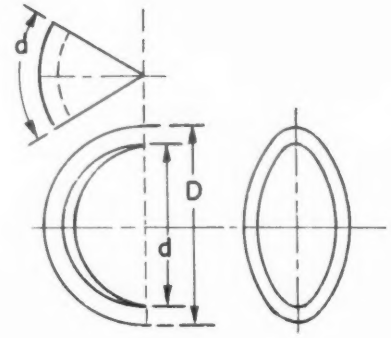
To find the weight of a ring of circular cross-section, multiply the radius of the cross-section squared by the radius of the circle passing through the center of the cross-section, by the value of M (Table XII).

$$W = r^2RM$$



To find the weight of a sector of a paraboloid, multiply the diameter of the base squared by the height, by the number of degrees in the angle by the value of K (see Table XIII) corresponding to the weight per cubic inch of material used.

$$W = D^2HaK$$



To find the weight of a spherical wedge, multiply the diameter of the sphere cubed by the number of degrees in the angle by the value of M (Table XIII).

$$W = D^3aM$$

Table XIII

Wt. per cu. in.	K	M	Wt. per cu. in.	K	M	Wt. per cu. in.	K	M	Wt. per cu. in.	K	M
.096	.000105	.000140	.210	.000229	.000305	.330	.000360	.000480	.450	.000491	.000654
.100	.000109	.000145	.220	.000240	.000319	.340	.000371	.000495	.460	.000501	.000669
.110	.000120	.000160	.230	.000351	.000334	.350	.000382	.000509	.470	.000512	.000684
.120	.000131	.000174	.240	.000262	.000349	.360	.000393	.000524	.480	.000523	.000698
.130	.000142	.000189	.250	.000273	.000363	.370	.000403	.000538	.490	.000534	.000712
.140	.000163	.000203	.260	.000283	.000378	.380	.000414	.000553	.500	.000545	.000727
.150	.000164	.000218	.270	.000294	.000393	.390	.000425	.000567	.510	.000556	.000741
.160	.000174	.000233	.280	.000305	.000407	.400	.000436	.000582	.520	.000567	.000756
.170	.000185	.000247	.290	.000316	.000421	.410	.000447	.000596	.530	.000578	.000770
.180	.000196	.000261	.300	.000327	.000436	.420	.000458	.000611	.540	.000589	.000785
.190	.000207	.000276	.310	.000338	.000450	.430	.000469	.000625	.550	.000600	.000800
.200	.000218	.000291	.320	.000349	.000465	.440	.000480	.000640	.560	.000611	.000815

Interpolation Table

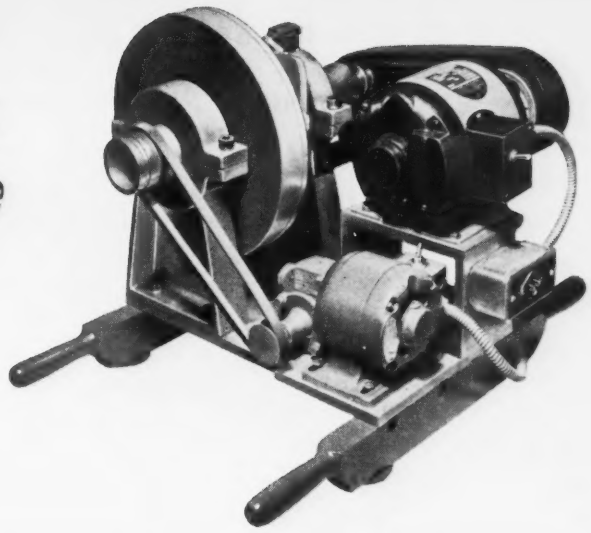
Add'l. Wt.	Add'l. K	Add'l. M	Add'l. Wt.	Add'l. K	Add'l. M	Add'l. Wt.	Add'l. K	Add'l. M
.001	.000001	.000001	.004	.000004	.000006	.007	.000008	.000010
.002	.000002	.000003	.005	.000005	.000007	.008	.000009	.000012
.003	.000003	.000004	.006	.000007	.000009	.009	.000010	.000013

For method of interpolation see Table II.

(To Be Continued)

(To Be Continued)

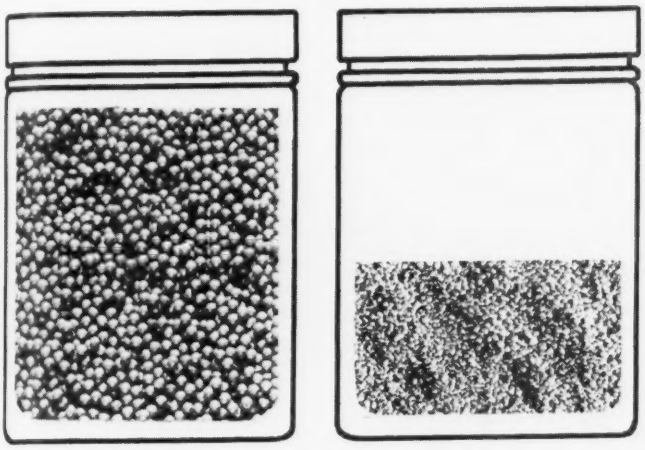
NOW . . . cut corners to quick shot quality analysis with Alloy Metal Abrasive Test Machine



This machine was developed to do the job automatically and obtain accurate breakdown results in a comparatively short time. A recycling device returns the material to the beater wheel, which is used for accelerating the shot against an anvil. This anvil is driven by a separate motor by means of belt control, and rotates about the same axis as the beater.

TEST RESULTS ON TWO ABRASIVES

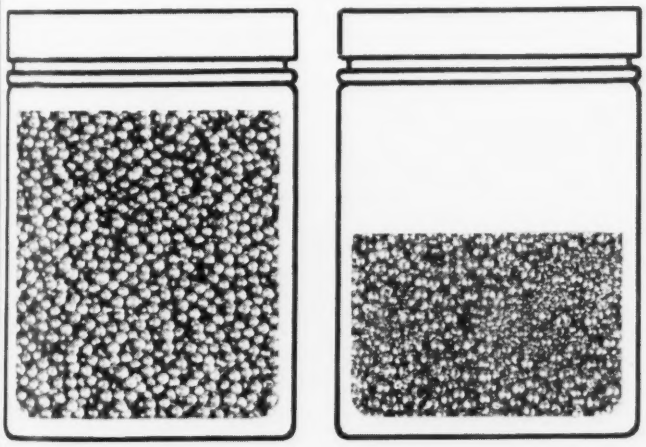
IRON SHOT



BEFORE
IRON SHOT in its original condition before testing.

AFTER
IRON SHOT after **200** passes thru test machine.

AMASTEEL SHOT



BEFORE
Here is a sample of AMASTEEL in its original condition.

AFTER
AMASTEEL after **2000** passes thru test machine.

NOTE THE FEATURES OF THIS MACHINE:

1. All the small broken down material is removed from the machine by an air-circulating device.
2. The machine reproduces the same conditions experienced in commercial blasting machines.
3. A positive feed control passes the material through a definite cycle without variations.
4. The machine is powered to maintain constant speed, which speed discharges the shot at approximately 200 feet per second, which corresponds with the velocity in the commercial blasting machine.
5. The machine is driven by a belt and shows accuracy on a uniform sample of an error not in an excess of ½ of 1%. If desirable, the machine may be gear driven.
6. The machine is hand portable and equipped with attached handles for easy movement.
7. The approximate machine time required for a test of a 100 gram sample broken down to a .010 size is as follows:
   hard iron—7 minutes; steel—60 minutes
8. The results obtained by the use of this shot tester can be directly applied to consumptive use per wheel hour in a commercial blasting machine.
9. This machine eliminates all the variables which are experienced when attempting to make the test in a commercial blasting equipment.

WRITE FOR FREE DEMONSTRATION IN YOUR PLANT WITH THE SHOT AND GRIT YOU ARE NOW USING.

For Better Finish, Use Alloy Metal Abrasives

REPRESENTATIVES IN MOST PRINCIPAL CITIES

ALLOY METAL ABRASIVE CO.

311 W. HURON ST., ANN ARBOR, MICHIGAN

PURDUE METAL CASTING CONFERENCE

Features Program on Diversified Foundry Subjects

By ERLE F. ROSS
Chicago Editor

FOUNDRYMEN of the Middle West spent two profitable days discussing their problems at the sixth annual Metals Casting Conference at Purdue University, West Lafayette, Ind., Oct. 29-30. Attendance of about 200 and an excellent program combined to put the 1953 event in the success category won by previous conferences.

Unlike last year's meeting, which was keyed around a central theme—what buyers of castings want and how producers can accommodate—this year's program was miscellaneous in nature. It treated with safety, dust elimination, sand handling, mold and core making, gating and risering, and relationship between molding materials and metal shrinkage.

The conference was sponsored as previously under the joint auspices of the university's department of general engineering, and the Michiana and Central Indiana Chapters of the American Foundrymen's Society.

J. A. Barrett, assistant general superintendent, National Malleable & Steel Castings Co., Indianapolis, was conference chairman, and C. T. Marek, associate professor of general engineering, and director of foundry education at Purdue, was co-chairman.

Program chairman was V. S. Spears, district manager, American Wheelabrator & Equipment Corp., Mishawaka, Ind., assisted by J. P. Lentz, assistant works manager, International Harvester Co., Indianapolis, Ind.

H. A. Bolz, head, department of general engineering, Purdue, was chairman of the opening session. He explained that objective of the conference was to get together to learn from each other, and then introduced W. A. Knapp, associate dean, schools of engineering, Purdue, to extend an official welcome. Response was made by AFS Vice President Frank Dost, president, Sterling Foundry Co., Wellington, Ill., who explained the objectives of the AFS in its service to the foundry industry.

"Don't Bet Your Life" was the theme on which Clyde R. Powell, public relations and safety authority, Lehigh Safety Shoe Co., Endicott, N. Y., built a most interesting hour's entertainment highlighting safety. Explaining that there is nothing brand new in safety, he undertook to deal with the subject from point of view of the showman. Being a former professional magician, he used tricks of magic, and these coupled with explanatory patter proved highly effective.

With playing cards, Mr. Powell showed several tricks of crooked gamblers. People think, he said, that "it can't happen to me." He claimed they have to be shown that it can. He emphasized too that there are many things in which people won't take chances, but when it comes to their safety they invariably will.

C. W. Hockman, foundry superintendent, Cadillac Motor Car Division, General Motors Corp., Detroit, spoke at the second session on "Automatic Core and Mold Production." J. P. Lentz, assistant works manager, International Harvester Co., Indianapolis, presided.

The speaker said that in his plant changes in foundry operations must improve castings going into Cadillac cars. He described the company's experience with two automatic multiple core blowers installed some time ago to solve a production problem in the coreroom. No. 1, a five-station machine, is capable of making 410 cores per hour, but best performance is obtained when it is set for 360 per hour. Coreboxes can be changed quickly and when one box must be replaced the other four continue in production.

In making heavy molds, like engine blocks, a power vent is employed with the machine, but this has worked well after the method was worked out. A number of safety devices have been put on the machines.

Compared with conventional blowers, the No. 1 machine can produce a maximum of 120 versus 42 molds per man-hour. The No. 2 automatic multiple machine has a maximum of 180 molds per man-hour against 105 maximum for conventional blowers. Average output compares 154 to 103 per man-hour.

The automatic machines, Mr. Hockman stated, effect substantial savings in labor and in space. They combine the operations of several conventional blowers and have the advantage they can be set on a given cycle. With their use, less scrap results and the castings have better surface finish.

The automatic multiple blowers now account for about 50 per cent of core production. By end of 1954 the plan is to have two more automatics installed, which will eliminate all conventional blowers. It was stated that new machines for Buick engine block molds are now being installed and will be in full operation by Jan. 1, 1954.

G. C. Dickey, works manager, Harrison Steel Castings Co., Attica, Ind., presided during the closing portion of the second session at which J. H. Kauffman, foundry engineer, Studebaker Corp., South Bend, Ind., spoke on "Pneumatic Sand Transfer." Pointing out that pneumatic conveying of

(*Concluded on page* 192)

This is a general view of the conference dinner, held on the evening of the first day

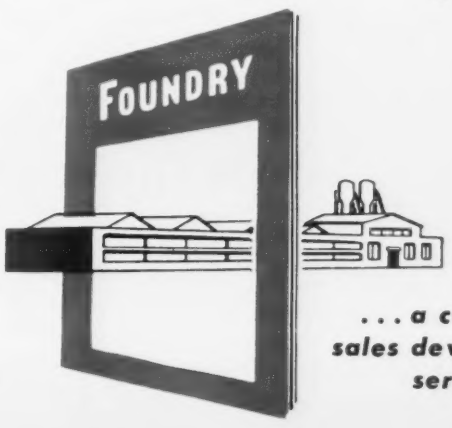
Foundry's PLUS 5 SERVICE

will help move your products

What is PLUS 5? It's your key to more business from foundries.

It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market.

It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.



More than a magazine . . .

. . . a complete sales development service

FOUNDRY • Penton Bldg. • Cleveland 13, Ohio

(*Concluded from page* 190)

core sand has been in use about three years, the speaker compared the method with standard batch equipment handling.

The monorail crane system is standard layout delivering prepared sand to areas where there are high building bays. Studebaker's experience is that handling sand pneumatically is practical. It shows also that pneumatic conveying is not the best answer necessarily if the use of lift trucks or monorail cranes is feasible.

Mr. Kauffman observed that the chief disadvantage of pneumatic conveying of core sand is maintenance of equipment, and its best advantage is flexibility in routing, while the advantages and disadvantages of a monorail crane operation are the opposite, low maintenance and sometimes difficulty in routing.

Concluding, the speaker said combinations of batch handling and pneumatic conveying equipment have merit and deserve consideration. Often the best features of each system can be realized in such a layout.

Third conference session featured K. E. Robinson, ventilating engineer, Research Division, General Motors Corp., Detroit, as speaker on "A Million Dollars of Dust Collection Equipment Won't Do a Bit of Good Unless Properly Hooded." George H. Adler, safety director, Auto Specialties Mfg. Co., St. Joseph, Mich., was chairman.

Systems Should Be Tested

The speaker declared emphatically that many dust collecting systems are not helpful — sometimes they are harmful. Industry frequently pays good money for systems that don't work, then spends more money to patch them up. All too frequently too, ventilation systems are installed, then they are never tested to determine if they do what they are designed to do.

The canopy hood should be retired, in the opinion of Mr. Robinson. There are many places where it should not be installed at all—over pickling tanks being a good example. A hood needs sufficient overhang and putting a skirt on it helps.

Always remember, the speaker urged, "that air isn't free. It costs you money."

"Some Modern Concepts of Gating and Risering" was presented by Charles Locke, works manager, West Michigan Steel Foundry Co., Muskegon, Mich., at the second and final paper at this session. M. J. Lefler, plant manager, Oliver Corp., South Bend, Ind., presided.

Commenting that there is nothing new in gating and risering, the speaker's contribution was essentially a review of practice. The subject is related to metal solidification—how it occurs and the mode. Studies of this had been made with steel—pouring and dumping of castings at various stages to determine solidification. This not yielding sufficient results, AFS organized its Heat Transfer Committee. From this group's activities, certain important information has been obtained.

In general, Mr. Locke stated, recommendation is to use the smallest possible riser that will supply the need of the casting during freezing. It also has been determined that the minimum volume of the riser to satisfactory feeding requirements is 3 per cent of total volume of the casting. Solidification is all a matter of heat, he continued. Therefore, it is a case of putting more heat in or of preventing heat from escaping. Good success is being achieved through use of exothermic materials.

"Well, no, sir, it isn't exactly a lightweight alloy. We're experimenting with my wife's biscuit dough."

Fourth and last conference session featured a joint contribution by Clyde A. Sanders, vice president, American Colloid Co., Chicago, and C. C. Sigerfoos, associate professor, Michigan State College, Lansing, Mich. Its title was "Present Comments and Opinions Regarding the Effect of Molding Materials on Apparent Metal Shrinkage." Chairman for this session was R. P. Schauss, sales manager, Werner G. Smith Co., Chicago.

This paper dealt with the investigation and research which the two authors have done in pouring castings made in molds from various sand mixtures, varying moisture contents, green sand and baked molds, loose and hard ramming, etc.

Certain indications can be cited but research has not been carried to the point where specific and positive recommendations can be made.

The conference dinner, held on evening of first day, was addressed by Dr. Earl Butz, head, department of agricultural economics at Purdue. Prof. R. W. Lindley officiated as toastmaster.

Guests of the conference at the dinner were about 60 students enrolled in the foundry course, and of these 19 hold scholarships under the Foundry Education Foundation.

Dr. Butz observed that the most constant thing we have in this country is change. Industry must adapt itself to this, or die. In the last 100 years most of our industrial progress has occurred, making this the age of science and engineering.

Despite this, he pointed out, we still do 60 per cent of our work by hand or hand methods. In the next generation, he predicted, we will direct power rather than produce it.

Present administration in Washington, Dr. Butz asserted, is seeking stability, not deflation. Next year in the business world will separate the men from the boys. National population is increasing at the rate of a new Detroit each year and this presents a constantly growing market. In conclusion, the speaker emphasized that the frontiers of science are limitless.

Booklet Covers Material Handling Integration

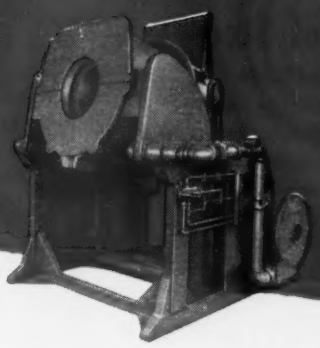
The proper relationship between material handling and other functions in an industrial organization such as tool design, process engineering, industrial engineering, plant layout, production and material control, purchasing, production, quality control and inspection, accounting, maintenance, personnel and product design is explained in a 12-page booklet published by the industry educational committee, Material Handling Institute, 813 Clark Bldg., Pittsburgh 22

The manual is designed to help in understanding the proper integration of material handling with other departments. This is the third book in a series and is available from the institute for 50 cents. Professors and students of material handling, however, may obtain copies without charge.

Book Review

Temperature Measurement in Engineering, by H. Dean Baker, E. A. Ryder and N. H. Baker, cloth, 179 pages, 6 x 9 in., published by John Wiley & Sons Inc., New York. Price $3.75.

Presented in this first of two volumes are facts useful in the design, construction and operation of an effective temperature measurement installation.



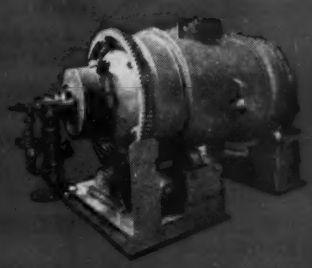
a complete line of

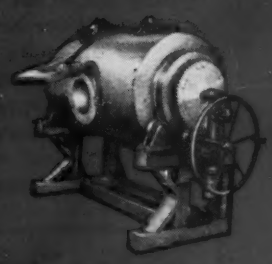
MELTING AND HOLDING FURNACES

by Lindberg-Fisher

for melting

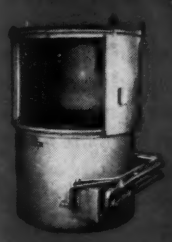
aluminum
magnesium
copper
copper-nickel alloys
bronze
brass
yellow brass
red brass
tin
zinc
lead
babbitt
type metal
gold precipitates
silver precipitates





Because Lindberg-Fisher builds *all* kinds of melting equipment . . gas . . oil . . electric . . induction, and carbon arc . . L-F engineers are able to recommend, without prejudice, the proper type of furnace for *your* particular melting requirements.

Melting specialists for 25 years
Sales and service offices in principal cities



Bulletin 551 covers the complete melting line. Write for your copy today.

LINDBERG-Fisher A DIVISION OF LINDBERG ENGINEERING CO.

2453 WEST HUBBARD STREET • CHICAGO • ILLINOIS

Heat Treatment of Steel

(*Concluded from page* 129)

steels to be temper brittle, while molybdenum has the opposite effect. At one time it was thought that a molybdenum content of some 0.50 or 0.60 per cent was sufficient to prevent temper brittleness in steels containing manganese and chromium, but it is now known that though molybdenum helps to prevent temper brittleness, it is not completely effective. If the castings are quenched after tempering at 1100 to 1200° F, they will not exhibit this loss of resistance to impact. Quenching after tempering in the harmful zone of 850 to 1100° F, however, has little if any beneficial effect.

There is, of course, a slight amount of stress set up in the casting when it is quenched from these comparatively low temperatures, but for most purposes the stresses are so slight that they may be disregarded. In this connection, the author stated in the first edition of *The Steel Foundry* (page 237), "that no harmful stresses are produced by air or even water cooling from the reheating temperature, has been proved by careful tests on stress test bars, and on full-sized castings of various shapes." In his early work, the author was dealing with low-carbon and intermediate manganese steels, which did not exhibit temper brittleness on slow cooling from tempering temperatures above 1100° F.

Up to some ten years ago, many specifications for heavy steel castings called for annealing practices involving very slow heating, prolonged holding above the transformation range, and furnace cooling to at least a black heat. One such specification called for 15 hr heating, 25 hr holding at 1600° F, and 24 hr cooling at 865° F, a total of 64 hr in the furnace.

In 1943 and 1944, Clark, Bishop and Taylor of the U. S. Naval Research Laboratory published the results of an investigation into the most desirable heat treatments to use on heavy castings.[9] Using test pieces 10 in. square and 20 in. long, they made extensive tests to compare the properties obtained by the use of the 64-hr treatment and those resulting from normalizing and tempering. They found, as was to be expected, that the prolonged annealing treatment resulted in the very coarse dendritic ferrite-pearlite microstructure shown in Fig. 19, whereas normalizing and tempering gave quite fine structure at both outside and center of the 10-in. coupon, as shown in Fig. 20. The mechanical properties resulting from the normalizing and tempering were somewhat better than those produced by the prolonged anneal, which naturally was more costly because it tied

As a result of their work, these authors stated, "Physical properties resulting from the single normalizing and tempering treatment follow very closely in most respects those obtained from other treatments of the same series. When this fact is considered in conjunction with reduced furnace time requirements and lessened scaling of castings as compared to the long annealing treatment or the double treatments, ... it is believed that the single normalizing and tempering treatment generally offers the best advantage for the type of castings involved".

The recommended practice consisted of heating at a rate of 450° F per hr to a temperature of 1650° F, holding at temperature 10 hr (1 hr per in. of cross section), air cooling to 800° F, heating at a rate of 400° F per hr to a temperature of 1250° F, holding 10 hr (1 hr per in. of cross section) and air cooling. This practice is practically identical with that recommended by the author in 1914.[10]

There is one class of steel castings in which the mechanical properties at normal temperatures are of only secondary importance, and high creep strength at elevated temperature is absolutely essential. These are the valves and fittings used in central stations and in oil refinery work, and the cast steel casings for steam turbines. These castings work at temperatures up to a dark red heat under high internal pressure, and the one absolutely essential property they must possess is the ability to hold their size and shape under long continued applications of stress. To give satisfactory service, the steel of which these castings are made must show a rate of extension under working stress at high temperature, of less than 1 per cent in 100,000 hr, or about 11½ years, or even less than this.

High Creep Rate

For some unexplained reason, steels with fine-grained ferrite-pearlite structure that have high strength-to-yield point ratio and great resistance to shock at normal temperatures, show a high rate of creep under stress at elevated temperatures. It has been found that to have high resistance to creep, the steel should have a very coarse microstructure, preferably of Widmanstaetten type and free from ferrite in large masses. The desirable structure is shown in Fig. 21.

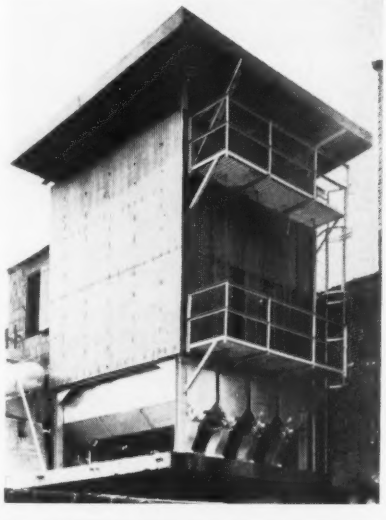
These structures are generally produced by heating to temperatures between 1750 and 1950° F, or even higher, cooling at moderate rates, and subsequently tempering to relieve cooling stresses. In the case of large heavy pieces, cooling in air or an air blast is the usual treatment. Smaller castings are handled in such a way that they cool at about the same rate as that of thick sections cooled in air. In all cases, low alloy steels are required for service of this type, generally containing chromium and molybdenum, and sometimes vanadium and nickel.

References

6. *The Steel Foundry*, by John Howe Hall (1914), page 236.
7. "The Heat Treatment of Hypoeutectoid Carbon Steel Castings," by John Howe Hall, *Proceedings*, American Society for Testing Materials, 1913, page 514.
8. The late J. A. Capp once told the author that he could prove that no piece of steel, however treated, is *completely* free from internal stress.
9. "Heat Treatment of Medium Carbon Cast Steel in Moderately Heavy Sections," by K. L. Clark, H. F. Bishop and H. F. Taylor, *Transactions*, American Foundrymen's Society, 1943, page 617, and *Transactions*, AFS, 1944, page 539.
10. *The Steel Foundry*, by John Howe Hall (1914), page 235.

Bag Type Suppressor Cleans Foundry Air

SUPPRESSOR: Clean, dustfree air inside the foundry is being achieved by Chicago Steel Foundry, Chicago, with a fiber glass, bag type suppressor installation which is the first of its type to be used in the midwest with electric furnace operation. The suppressor operates continuously, during charging, melting and tapping, drawing gases from the furnace area through ducts to the bag house, which is outside the foundry. Fiber glass bags utilize the "vacuum cleaner" principle in removing smoke, dust and fumes. Suppressor and furnace are products of the Whiting Corp., Harvey, Ill.



MATCHLESS QUALITY • NO PREMIUM

ALMAG 35

ALUMINUM ALLOY

MINIMUM YIELD STRENGTH 19,000 psi.

with No Heat Treating — Age Hardening

Elongation — 13-15%
Charpy Impact — 10.47 ft. lbs.
Tensile Strength — 37,000 to 40,000 psi.
All Properties As-Cast

Covered by U. S. Patents Nos. 2564044, 2628899, 2583473

Almag 35, for the first time, gives the designing engineer one aluminum alloy with all vital properties — as-cast. Almag's exclusive combination of high strength, high ductility, high shock resistance, high corrosion resistance, superior machinability, dimensional stability and stability of physical properties are instantly available with no heat-treatment or age hardening.

No other aluminum alloy offers these properties. You get them all in Almag 35 at no premium in cost.

Before you Specify ANY ALLOY — Ask for Bulletin 351.

WILLIAM F. JOBBINS INCORPORATED

P. O. BOX 230 **AURORA, ILLINOIS**

Adventures of Bill

By PAT DWYER

Illustration by RICHEY

NOT because I had any doubt on where he stood, but simply to hear his profession of faith, I asked Bill one night recently how much credence he attached to the value of the outside viewpoint. The outsider with a clear mind and a fresh, unbiased perspective is supposed to be able to spot all the weak points, the danger zones, the pitfalls that are concealed from the men who are too close to the firing line to see them or to avoid them.

So far as I know, no person yet has explained satisfactorily where this mythical outsider acquired this wonderful gift. Like many other traditions it has been repeated so often that it passes for gospel by people too lazy to look for proof.

"In my private opinion," I said to Bill, "that kind of talk is nothing but the purest and unadulterated drivel. Men who constantly study a given subject, who devote all their time to the solution of a definite problem, who concentrate all their energy to raising a business to a high state of perfection are infinitely better prepared and in an infinitely better position than any outsider to solve their own problems."

"Boy," Bill shouted heartily, "you sure said a mouthful that time. I don't know anything, for example, about the advertising business, but if I had any advertising business to place I would accept the opinion of men experienced in that line in preference to my own. However, that is neither here nor there. No benefit is to be gained by discussing something with which I am not familiar. During a long and fairly busy connection with the foundry I have had some slight bickerings with outside wise men who considered they were specially qualified by Divine Providence to suggest, criticize and improve on intimate details of foundry practice.

"Notwithstanding the fact that founding in metals is a highly specialized and intricate occupation depending for success on a well trained hand and eye, coupled with an understanding of the fundamental principles involved and a sixth sense only acquired through a long period of intensive application and observation, many people still seem to labor under the impression that the production of castings is only an elementary manufacturing enterprise. Some of the worst offenders are young engineers who have had perhaps 26 hours actual foundry practice in the shops connected with their institutions of learning. Because they have made a few washers in a snap flask they decide that molding is only child's play. Nothing to it beyond the capacity of any person over seven, or possibly eight.

"One of these brilliant young lads who had a job in the drawing office, came into the shop one day with the master mechanic and fairly bubbled with valuable suggestions. He was quite interested in a job going through the shop at the time—a set of 12 big base castings each one weighing 45 tons. The pattern was approximately 6 x 6 x 25 ft, and was molded in a pit.

"One casting had been lifted out of a pit and the men were lowering the salamanders into the second mold to dry it when the visitors arrived. Our hero's attention immediately was focused on the first pit which bore a striking resemblance to the tail end of an earthquake, or to one of the thousands of craters constructed with a prodigal hand over the greater part of Europe in World Wars I and II. Plainly he was quite disappointed at this criminal evidence of wasteful practice. With a distinct tone of suspicion in his voice he asked how the casting was lifted.

"He was told that on account of the limited crane capacity, one 20 and one 25 ton, the casting had been started one end at a time by digging away the sand and slipping a wire cable under the exposed end. Then the two cranes were hooked on, and although the combined casting and cores weighed about 60 tons we took one of the chances foundrymen have to take in an emergency. The casting was lifted out of the pit and placed on a cleared section of the floor. The old cranes groaned each time they were called upon for this service, but they lifted all 12 castings

(*Continued on page* 198)

The hard jobs they do first. Impossible jobs may take a little longer

POWER...

FROM THE "GROUND" SURFACE UP!

It Takes Lots of good grinding to produce such a rugged earthmover as this Caterpillar No. 6 Shovel

for Example:

PRECISION GRINDING { Valve Grinding, Cylinder Honing, Crankshaft Grinding, Cylindrical Grinding

and

HEAVY STOCK REMOVAL { Weld Grinding, Snagging

BAY STATE

BAY STATE SALUTES CATERPILLAR TRACTOR CO. . . . for brilliant design in this No. 6 shovel. Here indeed is a remarkable achievement of surging power with maximum compact maneuverability.

Each day, BAY STATE abrasive products play important parts in producing up-to-the-minute mechanical triumphs such as this. Each day too, more manufacturers are realizing the tremendous faith they can place in BAY STATE'S complete line of abrasive products and its excellent engineering service.

Call your BAY STATE distributor for the solution to any problem that involves your production grinding.

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Massachusetts

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

MANUFACTURERS OF ALL TYPES OF QUALITY GRINDING PRODUCTS

(*Continued from page* 196)

without mishap. Since they have been in daily use ever since, apparently they were none the worse for the manner in which they were abused. Foundry cranes certainly are a credit to their builders. They are tested more severely than cranes in any other part of the plant and I never yet have seen one fail to carry the load.

"'Let's see,' said Little Bright Eyes, giving a marvelous imitation of lightning calculating. 'A casting that size should contract about 3 in. in total length and about 1 in. in width. I should think if you were to attach proper handles to the top and observe even ordinary care in lifting it perpendicularly, you could remove the casting from the mold and leave the mold intact for another casting.'

"I have seen molds, or at least parts of molds, used repeatedly. It is done occasionally with sand molds and it is quite common practice with certain classes of loam molds where the outside wall is straight and smooth, or tapered to some extent from top to bottom. The base casting was not in that class. I gravely informed the young lad the idea truly was remarkable. So simple I was ashamed to admit it never had occurred to me. Keen, young analytical minds untrammeled by precedent and musty tradition certainly had it all over us old plodders.

"Our hero modestly dismissed our words of praise. He proceeded to show how rapidly a really clever young man can assimilate the vital factors of a problem and arrive at a solution. He directed attention to the mold into which the men were placing the salamanders. Not only was the practice of drying molds in the floor painfully primitive, but it also tied up valuable floor space. Surely we must be aware that in this bright, progressive and highly competitive age every foot of floor space should be utilized intensively. This large area lying idle while the mold was drying was evidence either of gross carelessness or of a lack of proper appreciation of this vital economic factor. The mold should be made in a flask and dried in an oven.

"Even though he was the president's son I manfully resisted the temptation to tell him the cost of two flasks would add several pennies to the cost of the job. We would need patterns. We would need floor space to make the flask castings. We would have to assign molders to this work at a time when the shop was filled, as usual, with rush orders. Unless he knew some way to make a 30-ft flask of rubber, I was afraid we would have a real problem on our hands in getting it into a 20-ft oven.

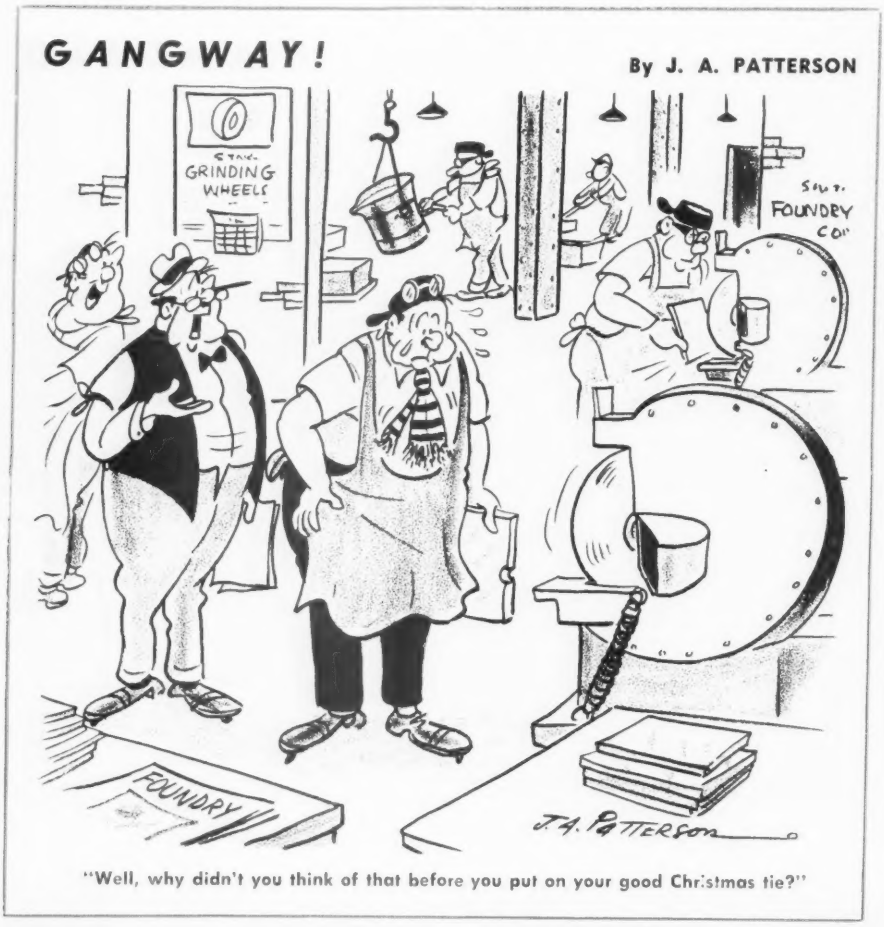
"The outside viewpoint—and you can quote me on this me boy—is just so much applesauce. So are the other old bromides 'far-away cows have long horns' and 'the grass always is greener on the other side of the fence, or across the road.' This was brought to mind one day last May at the AFS convention in Chicago. Following an animated steel session a group of the boys continued the discussion while restoring the tissues with a spot of lunch. Without benefit of umpire and with no holds barred, one portly gent claimed that steel foundry practice in Europe was way ahead of practice in the United States. In support of his statement he quoted from the report of a naval officer who was sent abroad several years ago to study European steel foundry practice."

"I remember the incident," I said. "A review of his findings followed by discussion by several prominent American steel foundry authorities appeared in the February and May 1933 issues of the *Journal of The American Society of Naval Engineers.* Later in the same year, FOUNDRY presented a series of four articles under the title "Cast Steel in Europe and America," quoting freely from the published reports. The series presented a vigorous defense of American steel foundry practice."

"I read the articles in that series. A very calm and complete review of the subject, singularly free from brickbats and bouquets. Expansion of the steel casting industry in the United States within the memory of living men presents the most outstanding example of metallurgical, mechanical and commercial progress in the history of this or any preceding century. The foregoing also applies to the steel foundry industry in Europe where progress has followed along parallel lines. To claim that the practice in one country is markedly superior to that in another country is contrary to the knowledge of all who are competent to express an opinion on the subject.

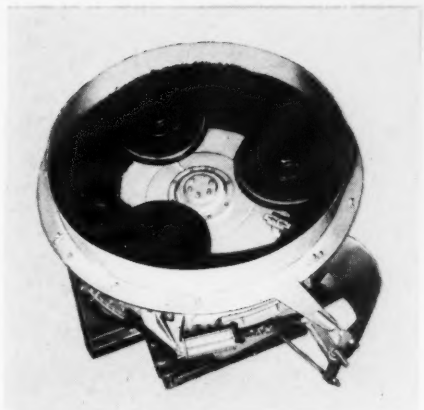
"Skill and experience gained through a long period of manipulation and actual contact enable the foundryman to predict in advance the approximate degree of perfection in any given casting. Certain variable factors over which he has absolutely no control prevent any foundry at any time from furnishing a positive guarantee that the casting from any given mold will be perfect. Out of every hundred castings produced under exactly similar con-

(*Concluded on page* 201)



"Well, why didn't you think of that before you put on your good Christmas tie?"

How does the SPEEDMULLOR cut maintenance costs?



A truly modern machine, designed to give maximum mulling with minimum maintenance.

Foundry maintenance is a major problem. The careful foundry equipment buyer checks maintenance features carefully before purchasing a mullor. The careful mullor manufacturer builds these features into his machines.

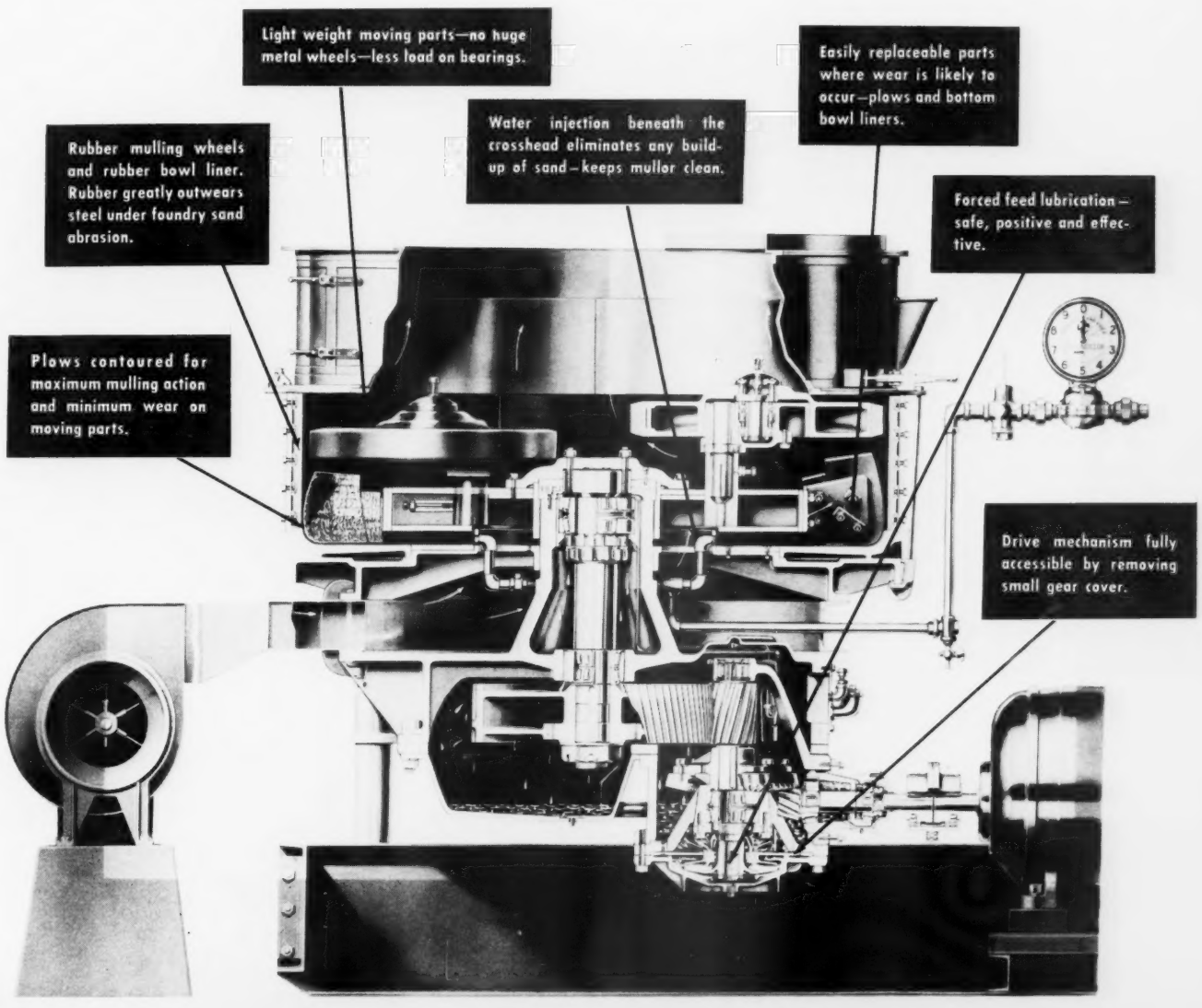
Look at the maintenance cost cutting features of the Speedmullor. It is designed to save you money not only when installed but for years and years after that.

write today for complete information

BEARDSLEY AND PIPER
DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue, Chicago 39, Ill.

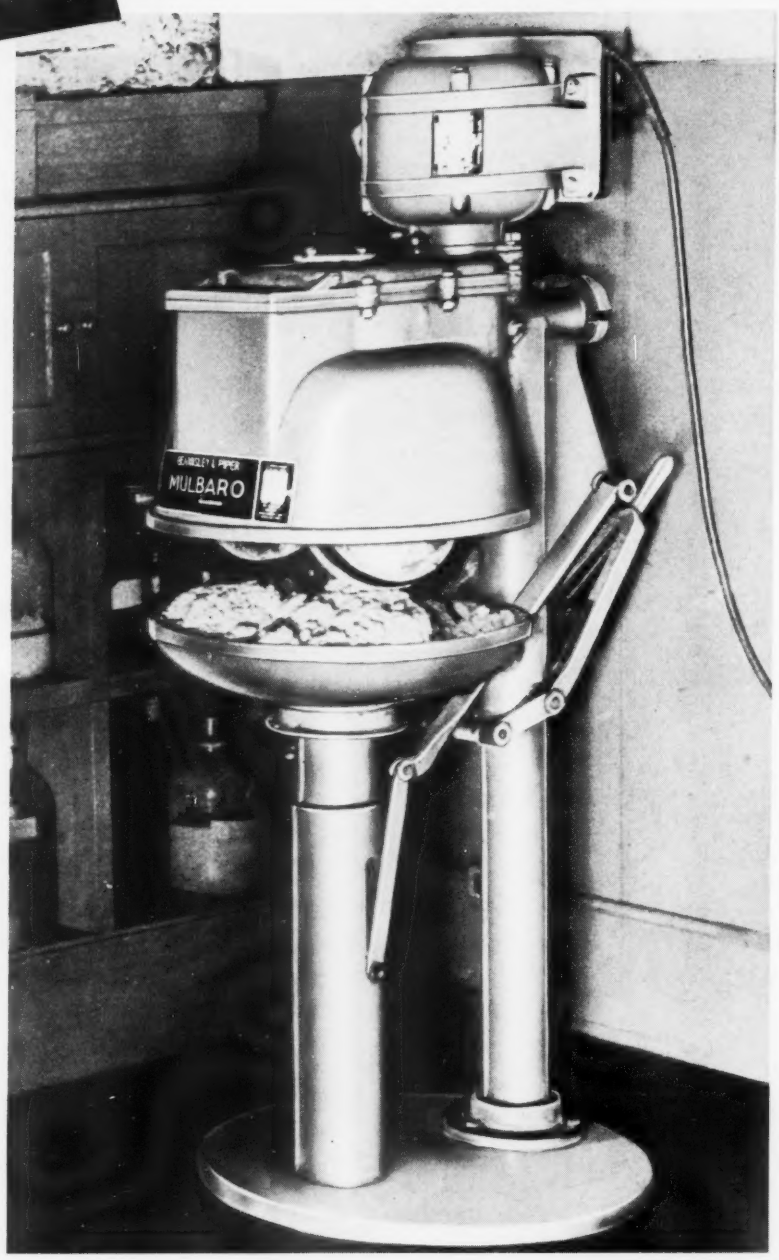
LOOK TO BEARDSLEY & PIPER FOR BETTER METHODS

MEMBER FEMA


Light weight moving parts—no huge metal wheels—less load on bearings.
Easily replaceable parts where wear is likely to occur—plows and bottom bowl liners.
Water injection beneath the crosshead eliminates any build-up of sand—keeps mullor clean.
Rubber mulling wheels and rubber bowl liner. Rubber greatly outwears steel under foundry sand abrasion.
Forced feed lubrication—safe, positive and effective.
Plows contoured for maximum mulling action and minimum wear on moving parts.
Drive mechanism fully accessible by removing small gear cover.

Easier to use
Easier to clean

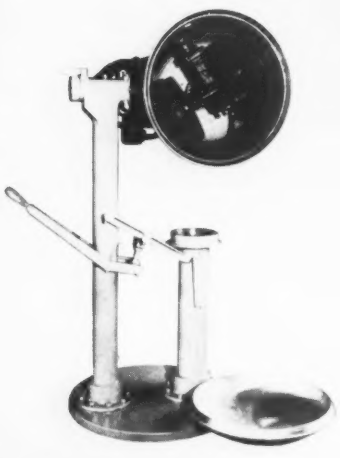
The LAB MULBARO



SPECIFICALLY DESIGNED FOR SAND LAB USE

Only the Beardsley and Piper Mulbaro is specifically designed for use in a foundry sand laboratory. Its removable mulling bowl may be carried to a lab bench or out into the foundry for loading, and several bowls can be used with one Lab Mulbaro. After mulling, the bowl may be carried to another part of the lab for sand testing.

The advantages of scientific rubber-tired mulling with spring-loading (by the originator of spring loading) are yours with the Lab Mulbaro too. The mulling bowl is contoured for maximum mulling efficiency. This inexpensive laboratory tool will permit exact control of your molding and core sand properties.



Tilting mulling mechanism and removable mulling bowl make the Lab Mulbaro the ideal foundry tool . . . easy to use, easy to clean.

write today for complete information

BEARDSLEY AND PIPER
DIV. PETTIBONE MULLIKEN CORP.
2424 N. Cicero Avenue, Chicago 39, Ill.

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

(*Concluded from page* 198)

ditions it is not unusual to find one or two defectives. This casualty feature is so well recognized by all practical foundrymen as part of the usual routine that it has been incorporated in a shop axiom: 'The foundry that never made a bad casting, never made a good one.'

"Strange as it may seem, this is a feature that cannot be explained to the satisfaction of the ordinary layman, or—and he usually is the more resistant of the two—to a young scientific or technical man with no practical knowledge or experience. The average layman is not particularly interested in the subject. He says in effect you may be right and you may be wrong. Have it your own way. He has troubles enough of his own. The pure scientist or the technical man lacking practical experience takes the militant view—a view invariably derogatory to the reputation and attainments of the man in the shop. He has no patience with the shop man who cannot promise positively in advance that a casting will be perfect when it is shaken out of the mold. No man can make a promise of that kind. Any foundryman knows that.

Through circumstances over which he had no control Cellini's statue of Perseus was minus a heel on one foot when shaken out. Even the select group of gods and friends on high Olympus would not get a 100 per cent rating from a sharp eye inspector. A brinell test on Achille's heel would knock out that doughty champion. A tensile test on Vulcan's lame leg would have kept that hero's name out of the sport page and off the television.

"The amateur loses sight entirely, since he never has conducted an experiment himself, of the important fact that every casting is the result of an experiment. Each casting is a new and shining object never before in existence. Irrespective of the care exercised in assembling the mold and in melting and pouring the metal, the final test is not applied until the metal fills the mold and is changed from the liquid to the solid state, where it is subjected to an irresistible natural law which reduces the volume approximately 1/36th or 2.8 per cent.

"Human care, human skill, precision and accuracy may be cultivated to a high degree, but absolute perfection and infallibility have not been attained up to the present in the steel casting field, or in any other field either in Europe or in America.

"In many instances the shop man is not familiar with the reasons which influence the engineer in designing the casting. The engineer is not familiar with the foundry technique involved in the production of the casting. Consultation between the two readily may lead to a compromise in which the changed design in no manner will affect the function of the casting, but will facilitate the work of the foundryman and remove certain hazards from the sum total which threaten the production of any casting."

Apprentices Demonstrate Foundry Practice

JOINTLY sponsored by the Wisconsin Manufacturers Association and the Wisconsin Industrial Commission, the Metal Trades Apprenticeship Exhibit at the 1953 Wisconsin State Fair consisted of a pattern shop, foundry and machine shop which actually manufactured metal ashtrays, from blueprint to finished product. Twenty-seven metal manufacturing companies in the state jointly underwrote the expenses of setting up the exhibit under the direction of association and committee representatives.

Apprentices from each of the trades involved worked in the various sections. In all, 36 apprentices put in the equivalent of two days each during the nine-day fair. Their employers paid them regular wages for time spent on the job and in some cases even paid double time for Sunday work.

Wood patterns were made for the 2½-lb castings, which were 2 in. high and about 7 in. in diam. Aluminum alloy was used because of the comparatively low melting point, and a gas-fired furnace with a 15-lb crucible was used for melting. Molds were made on a squeezer machine with the hand set wood pattern and a metal matchplate prepared in advance.

Two to four molds were poured at intervals of approximately 45 minutes. The castings were cleaned in a sandblast cabinet which was part of the foundry equipment. Clean castings were machined on the lathe and on a milling machine in the machine shop area. As a final touch, the trays were engraved with souvenir lettering on a pantograph. Capacity crowds are reported to have gathered whenever a mold was being made on the squeezer or when a pour was in process.

Drawings were held every hour to give away ashtrays as souvenirs to members of the audience.

ELIMINATES SMOKE . . . . . SPEEDS PRODUCTION . . . . .

Leading Aluminum Foundry Switches to PETERSON'S SMOKELESS DRY BINDER

PAT. APP. F

"By changing from core oil to Peterson's Smokeless Dry Binder we have eliminated all smoke in our coreroom and foundry, and have tripled oven production. Baking time from 15 minutes to 3 hours compared with oil baking time from 3 to 10 hours, depending on size of core. We are a jobbing foundry with a great variety of work. Since using this product our castings are smoother and cleaning time has been reduced. Also no blows in our castings."

Altman & Koehler Co., Chicago, Ill. (H. H. Altman, Presider

PETERSON CORE OIL & MFG. CO. P.O. BOX 99, Melrose Park, Ill

MANUFACTURERS OF PASTEX,
CORE PASTE, CORE OIL,
PARTING, CEMENT,
DRY BINDERS, ETC.

Core Blowing Equipment and Use

ABC of Foundry Practice

By PAT DWYER, *Engineering Editor*

THE following inquiry was received from a foreign foundryman: "Our core blowing machine has a hand operated U-shaped agitator which is not very effective. We find it difficult to blow high-strength sand without comparatively large blow holes which necessitate heavy venting. Do the American machines advertised in FOUNDRY employ mechanical means of agitation?

"One of our chief difficulties is piping in the magazine. We have placed tapered blocks inside the magazine on the blow plate to direct the sand to the blow holes, with moderate success. Has any attempt been made in the conventional blower to create agitation by means of cross current of air, or would this interfere with the main blow stream?

Lists Other Questions

"We shall also appreciate your comment on the following: 1—Have American foundries evolved any ratio of blow holes to vent area? 2—Has any method been adopted relating diameter of blow holes to volume or surface area of core, with due respect to shape? 3—Are most cores in American foundries blown with one shot? 4—Would additional shots produce a denser or more tightly packed core? 5—Could you suggest a core sand mixture for blowing cylindrical cores on end? 6—Would it be feasible to blow a core 1⅜ x 6-in. on end without a wire? For a binder we use linseed oil base core oil and dry cereal with a small amount of fuel oil as lubricant."

Several interesting items in the foregoing inquiry suggested the advisability of seeking advice and information from men who have developed and now are engaged in the manufacture of core blowing equipment. Courteous co-operation in every instance almost exceeded expectations. In addition to material from articles presented in recent years in FOUNDRY and other technical publications, we received several personal contributions. Some authors prefer to remain anonymous, but their comments are incorporated in this and three additional articles to be presented in coming months.

Early Developments — The core blowing machine first was introduced to the foundry coreroom about forty years ago. At that time and for many years thereafter the foundryman who decided to make use of the blowing principle of core production had to be a rather self reliant individual. He had to work out his own technique for corebox rigging and sand preparation since the existing sand mixtures and coreboxes in most instances were unsuitable.

In the early days of the core blower, the various ingredients of the core sand mixture were not very highly developed. The usual procedure was to mix linseed-base core oil with sharp sand, a little kerosene and a dry binder—mainly dextrine—and a little bank sand. Whatever may have been the combination that finally worked, the information was considered highly confidential and was closely guarded.

The expertly prepared sand was shoveled into the hopper of this new type core machine so designed that by proper manipulation of the valves the sand in the reservoir was blown by compressed air through suitable holes into a corebox.

Certain preparations had to be made in the corebox, locating and drilling the blow holes and providing means to allow escape of air trapped in the box. Most of the venting was known as joint venting by scoring the box joint with a fine file. Openings were large enough for the air to escape, but too small for the sand to go through.

Progress was slow. Early users of core blowers found this method economical and efficient. They carefully guarded the technique they had learned the hard way. Those who were unsuccessful dubbed the core blower a failure. With constant improvement in machines and materials the art of blowing cores grew slowly but surely from about 1920 to 1929. The greatest development in the use of core blowers has been in the last 15 years. Machines today are available for blowing cores ranging in weight from a few ounces to several hundred pounds. Controls for these machines may be manual, semiautomatic or completely automatic and include mechanical handling of the corebox.

Machine Fundamentals—Early experiments indicated the necessity of certain fundamental features:

1. A sufficient supply of dry air through a line of ample capacity at a pressure not less than 80 psi.
2. Properly prepared sand.
3. Machine clamps horizontal and vertical of sufficient capacity to clamp the box tightly.
4. The machine should be equipped with a suitable size reservoir.
5. Large reservoirs for blowing small cores are not practical.
6. Holes in blow plate to accurately match holes in corebox.
7. Corebox machined parallel top and bottom. If clamped from side, both sides should be parallel. Joint accurately fitted to prevent sand leakage. A guide rail and stop should be provided so that holes in the box will line up with holes in the blow plate. Blow holes should be spaced so that sand will enter the corebox and pack the sand uniformly from the bottom up. Air release vents are inserted at various points to divert the sand stream to pockets and corners and around bosses. Vents in the lower part of the box are necessary, but they lose their efficiency when covered with sand. Therefore, more vents are needed in the upper part of the corebox.

Accepted Core Blower

Due to simplicity of design and ease of corebox rigging, the bench type core blower introduced about 1943 was accepted promptly by foundrymen for blowing small cores ranging in weight from a few ounces to 2 lb with a surface area of approximately 24 square inches. After filling the cartridge with sand by hand, corebox and cartridge are placed in the machine. The cartridge is held tightly to the corebox by applying pressure on the clamping lever and pressing down on the blow control lever. The clamping lever is held down slightly longer than the blow lever to permit exhaust air to escape.

The diaphragm type machine is available in several sizes for blowing cores ranging in weight from a few ounces to 15 lb on the smaller size to 50 to 200 lb on the largest machine. Maximum core surface area is approximately 140 square inches on the smaller machine and 600 square inches on the largest machine. Meth-

(*Concluded on page* 205)

Picker *specializes* in x-ray, and x-ray only, covering the field like a blanket. *Whatever you need, we've got* . . . from a simple lead letter to a 22,000,000 volt betatron. To serve you, there are sales offices and service depots in all principal cities, staffed by skilled engineers prepared to cope with any x-ray problem promptly and with understanding. If you are now using x-ray, or are wondering whether you should, you can depend on Picker for objective technical counsel and efficient handling.

PICKER X-RAY CORPORATION 25 S. Broadway, White Plains, N.Y.

SALES OFFICES AND SERVICE DEPOTS IN PRINCIPAL CITIES OF U.S.A. AND CANADA

(*Concluded from page 203*)

od of moving the blow head or sand chamber to the blow position over the corebox should be mechanical. A sufficiently large air inlet to the machine should be provided so that when more and larger blow holes are used, the pressure drop from the blow valve to the corebox is held to a minimum. A 2½-in. air inlet pipe is recommended for the smaller size blower, and a 4-in. pipe on the larger size.

The draw type core blower is substantially the same as the diaphragm machine except that a cylinder and piston perform the clamping operation. The upper half of the corebox usually is mounted on the blow plate. The core is drawn from the upper half of the corebox on the down stroke of the clamp piston. Side clamps are used only on special applications. Clamping pressures on the diaphragm type and the draw type machines range from a minimum of 7500 lb on the smaller machines to 55,000 lb on the large machines. These pressures must be considered when designing and building corebox equipment.

One prominent core blowing machine builder gave the following replies to the numbered questions:

(1)—Although not universal practice, some American core blowing machines employ the mechanically operated sand agitator and cross currents of air. Replying to the numbered questions in order of presentation one prominent core blowing machine maker states that the recommened ratio of blow holes to corebox vents is 6 to 1 of equal size. That is six ½-in. corebox vents for every ½-in. blow hole, or twenty-four ¼-in. vents for every ½-in. blow hole. It is not always possible to attain this ratio. A core made from high strength sand needs more venting than an oil sand core. There are cases where oil sand cores are blown without vents. As a general rule too many vents will do no harm.

(2)—Maximum limit of sand delivered through a ¼-in. hole is 1 lb; through a ½-in. hole 4 lb; through a 1-in. hole 16 lb. General practice is to deliver one-half of these amounts through each blow hole. We do not expect the blow holes to deliver sand effectively more than 2 in. away from the blow hole. Therefore, blow holes rarely are spaced more than 4 in. apart. Practically every corebox is of different size, shape and design. Each corebox presents a different problem. These figures are given only as a basis from which to start when rigging a corebox for blowing.

(3)—When operating satisfactorily all core blowers should blow the core with one shot.

(4)—Cores 1⅜-in. diam, 6 in. long usually are blown on end using a ventilated bottom plate and a vented blow plate. To stiffen the sand so that there will be no sagging in handling or baking, a small amount of bentonite or bank sand is added to the mixture. In American midwest foundries the following mixture is typical: 100 lb dry lake sand, 3 lb cereal, 3 lb water, 1 lb linseed oil, ½ lb kerosene. Linseed oil and kerosene should be added last. Mulling time 5 minutes. Addition of ½-lb bentonite may be required if the cores show a tendency to sag.

(*To be continued next month*)

Foundry Hires Disabled Persons and Wins Award

The state of Washington has awarded its annual Award of Merit for Employment of the Handicapped to Pacific Car & Foundry Co., 220 West Hudson St., Seattle 8. The honor was accorded because of the firm's outstanding record in employing 215 handicapped persons among its fewer than 2000 employees. The firm's foundry is in Renton, Wash.

Steel Founders' Society Sponsors Contest

PRIZES totaling $3500 will be awarded by Steel Founders' Society of America to winners of its product development contest. Designed to promote and stimulate interest in the greater utilization of cast steel as an engineering material and to encourage engineers and designers to become more familiar with the engineering properties and characteristics of cast steel, the contest is open to all persons except members of the society's staff or its committee on national product development.

Those eligible to participate will be divided into two classes. Class 1 will consist of all employees of producers of steel castings in the U. S. A., Canada and Mexico. Class 2 will consist of all other persons, such as employees of customers of the steel castings industry, college students and designing engineers. Separate awards will be made in each class, and entries in the two will not compete with each other.

First prize will be $1000, second prize $500 and third prize $250 in each class. In addition, gold, silver and bronze seal certificates of merit will be awarded to first, second and third prize winners, respectively, in each of the eight geographical divisions of the society. All divisional award winners will be eligible for the national awards.

Judging will be based on the following factors:

1. Is this a new application for the use of steel castings?

2. Will the use of steel castings benefit the end product and a. Improve service life? b. Reduce cost of production? c. Increase strength without increasing weight? d. Reduce weight without sacrifice of strength? e. Increase strength and reduce weight? f. Improve appearance and quality? g. Improve manufacturing methods?

3. Is this a conversion from another material or process, such as: a. A weldment? b. A forging? c. Another ferrous casting? d. A nonferrous casting?

4. Is this a process of joining two or more steel castings together by welding?

5. Is this a process of joining steel castings and other structures or materials together by welding?

6. What methods were used in arriving at the new design or process and what methods were used in proving the benefits gained from the use thereof?

7. Has the presentation been made completely and clearly?

8. How much originality and creative thinking is involved in the presentation?

Wherever possible, entries in Class 1 should be illustrative of actual case histories that have been put into production in the steel industry, but new ideas will receive equal consideration. Entries in Class 2 should stress new ideas, but descriptions of actual case histories of the type emphasized in Class 1 are of equal value. Case histories and designs should have been developed since Jan. 1, 1951.

The national product development committee of the society constitutes the award committee. Judges will be appointed by the award committee, and their decisions will be final. Closing date is Nov. 1, 1954, and all entries must be postmarked not later than that date. Awards will be presented at the March, 1955, annual meeting of the society. Further information is available from the society, at 920 Midland Bldg., Cleveland 15.

Activities of Foundry Groups

Pittsburgh

AN address by L. D. Richardson, divisional sales manager for Eutectic Welding Alloys Corp., Flushing, N. Y., highlighted the Oct. 19 meeting of the Pittsburgh Foundrymen's Association. About 130 members and guests gathered at Webster Hall Hotel for the dinner session. At the meeting the resignation of Frank H. Reuwer, the association's president, was announced. Mr. Reuwer, of Westinghouse Electric Corp., was transferred Nov. 16 to become manager of the company's Buffalo plant.

Mr. Richardson, after a short historical background, explained procedures and techniques used in welding gray iron, malleable, pearlitic malleable and nodular irons as well as nonferrous and steel castings. He also described welding procedures being used by many foundries for maintaining foundry equipment. He explained foundry hard-surfacing and the application of wear-resistant welding alloys, also welding maintenance of various types of foundry machinery. The talk was illustrated with slides and was followed by a lively question period.—*Robert Love.*

Chicago

FIRST in the series of four roundtable meetings which the Chicago Chapter, AFS, is scheduling for its 1953-54 season was held Nov. 2 at the Chicago Bar Association. Attendance was approximately 200 members and guests.

Chapter President John A. Rassenfoss, assistant research director, American Steel Foundries, presided and handled routine matters of business. He announced the annual Ladies' Night would be held Feb. 27. Membership Chairman Deming H. Lucas, sales representative, Pittsburgh Metals Purifying Co., reported for his committee.

Robert L. Doelman, chapter vice president, and sales engineer, Miller & Co., introduced participants in three roundtable sessions.

The Malleable Division session devoted its attention to "Merits of Sand and Binders in Core Sand Mixtures" with Earl E. Woodliff, consultant, Foundry Sand Service Engineering Co., Detroit, as speaker. K. P. Smith, general foreman, Chicago Malleable Casting Co., presided. The Gray Iron and Nonferrous Divisions sat in at this roundtable.

The session sponsored by the Pattern Division heard Stanley W. Wilcox, president, White Pine Lumber Co., Chicago, discuss "Treatment of Lumber for Patterns." He accompanied his presentation with an ex-

(*Continued on page* 208)

NORTHERN CALIFORNIA Chapter of the AFS heard Ben Berlien, left, Industrial Steel Treating Co., Oakland, Calif., discuss "Heat Treatment of Castings" at the Oct. 12 meeting, at the Hotel Shattuck, Berkeley, Calif. Philip McCaffery, General Metals Corp., was technical chairman. Members and guests turned out a record 173 strong at the chapter's 19th annual outing and golf tournament at the Orinda Country Club, Orinda, Calif., on Sept. 25. First, second and third low gross golf prizes and the booby prize for the highest score were won by Arnold Boscacci, Gene Boscacci, Terry Boscacci and Alexander Love, respectively, all with American Brass & Iron Foundry, Oakland. A floor show after dinner was enjoyed by everyone, as the scene below shows

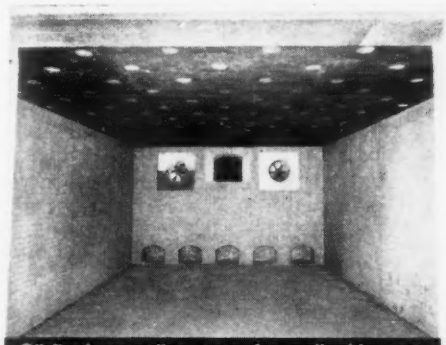
IMPROVED annealing cycles

through

A. P. GREEN

Engineered

REFRACTORY LININGS



Oil-fired annealing oven for malleable castings. The flat suspended arch is KAST-O-LITE and the sidewalls are G-23 Insulating Firebrick.

Malleable operators report easier controlled annealing cycles through the use of the proper combination of A. P. Green refractories. Efficient furnace operation means lower production costs and better control of the physical properties of the castings. It can only be achieved by a refractory enclosure which contributes to the desired annealing cycle.

A. P. Green KAST-O-LITE insulating refractory castable was used throughout sidewalls and arch for this pulverized coal-fired oven.

The two ovens illustrated are typical examples of A. P. Green engineered refractory linings. One is a complete monolithic lining of A. P. Green KAST-O-LITE, a light weight castable refractory. The other is a combination lining—KAST-O-LITE arch and G-23 Insulating Firebrick sidewalls. Both have excellent performance records effecting improved product quality at reduced fuel costs.

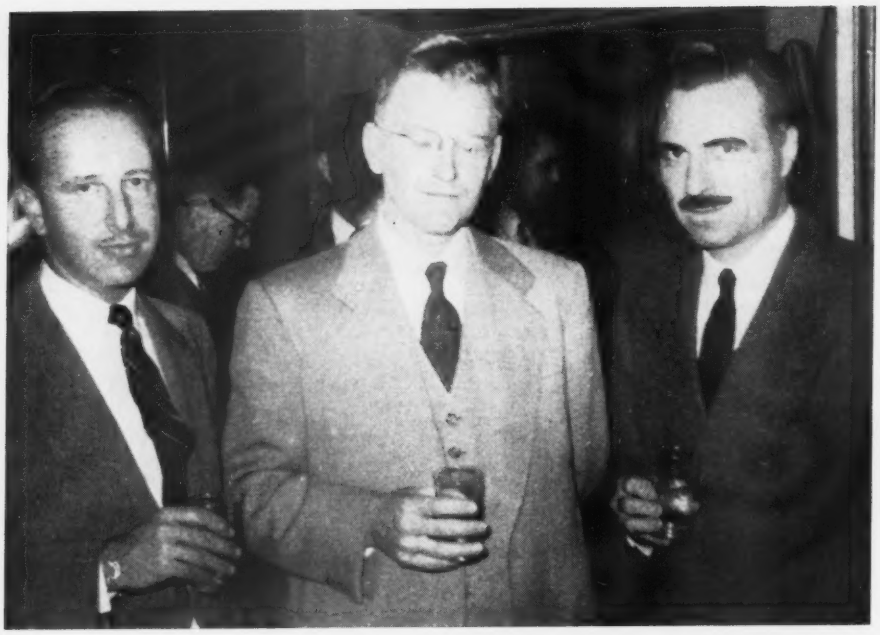
The A. P. Green Fire Brick Company Engineering Department will assist you with further information on the application of these materials to new units or the conversion of existing furnaces. Call your local A. P. Green distributor . . . he's listed in the yellow pages of your telephone directory . . . or write . . .

A. P. Green REFRACTORY PRODUCTS

A. P. GREEN FIRE BRICK COMPANY
MEXICO, MISSOURI, U. S. A.

In Canada:
A. P. GREEN FIRE BRICK CO., Ltd., TORONTO 15, ONTARIO

DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD



TWIN CITY Chapter of the AFS met with the Twin City Chapter of the American Society for Metals on Oct. 15. Left to right are AFS Chapter Chairman O. Jay Myers, Archer-Daniels-Midland Co.; Dr. J. C. McDonald, assistant technical director, Dow Chemical Co., Midland, Mich., the speaker; and W. B. F. MacKay, department of metallurgy, University of Minnesota, chairman of the Twin City Chapter of the ASM, which was the host chapter

(*Continued from page* 206)

hibit of woods for foundry and pattern use. Chairman was Robert S. Hendry, foundry superintendent, Love Bros. Inc.

Maintenance and Steel Divisions combined their efforts in a session which was devoted to "Selection, Operation and Maintenance of Blast Cleaning Equipment." Speaking on the subject were A. Lesley Gardner, advertising manager, Pangborn Corp., Hagerstown, Md., and Robert M. Rich, district sales engineer, American Wheelabrator & Equipment Corp., Mishawaka, Ind. Harold L. Rekart, plant engineer, National Malleable & Steel Casting Co., was chairman and George DiSylvestro, foundry technician, Burnside Steel Foundry Co., was co-chairman.

Roundtables also are scheduled for the next chapter meeting, Dec. 7. Gray Iron and Malleable Divisions will combine to discuss "Cupola Control"; Steel will have a panel discussion; Maintenance Division will consider "Shakeout Operation"; and the Nonferrous and Pattern Divisions will join to consider "Use of Magnesium Patterns and Coreboxes."—*Erle F. Ross*

PINE STATE FOUNDRYMEN'S ASSOCIATION met in Portland, Me., on Oct. 6 to hear Ray Olson, Shell Process Inc., Chicopee, Mass., speak on "Shell Molding Equipment and Advantages." Left to right, top view, are C. Legendre, Enterprise Brass & Iron Foundry; Harlan Penney, J. W. Penney & Sons; and Mr. Olson. Below are Charles Bullard, Portland Stove Foundry; Lloyd MacFadden, Androscoggin Foundry; and Donald Lawrence, Portland Stove Foundry. Photographs are by courtesy of C. A. Wyatt, Debevoise-Anderson Co., Boston

Twin City

ANNUAL joint AFS-ASM meeting was hosted this year by the Twin City Chapter of ASM and was held Oct. 15. Special guest who contributed much to the enjoyment of the gathering was Bebe Shoppe, better known as Miss America of 1948.

Technical speaker was Dr. J. C. McDonald, Dow Chemical Co., whose talk was entitled "Designs for Magnesium." Throughout his presentation, Dr. McDonald stressed the relative rigidity of magnesium as compared with such structural materials as aluminum and steel. He stated that advances over the past few years have developed fabrication procedures for magnesium so the only general methods which have not yet been applied to the metal are soldering and brazing.

Dr. W. B. F. MacKay, assistant professor of the Department of Metallurgy, University of Minnesota and chairman of the ASM chapter, directed the discussion period following Dr. McDonald's talk.—*R. J. Mulligan, Archer-Daniels-Midland Co.*

Texas

THERE were 64 members and guests present at the Oct. 12 meeting of the San Antonio section of Texas Chapter of the AFS. The meeting was held at the Alamo Iron Works, San Antonio, at which a talk entitled "More and Better Castings at Less Cost with X-Ray" was presented. A. L. Pace, X-Ray Department, General Electric Co., Milwaukee, was the speaker.—*E. W. Pruske, Alamo Iron Works*

Washington

TO open the current chapter year, Washington Chapter of AFS featured a talk on "Safety, Hygiene and Air Pollution" by William N. Davis of national AFS headquarters.

Mr. Davis pointed out that the best safety device in a foundry is a safe worker, and the logical person to develop a safe worker is the super-

(*Continued on page* 210)

Accept No Substitutes!

HELSPOT—for lining all types of ladles, cupola wells, spouts, runners, etc.—was introduced on the market during World War II. It was hailed as "a great contribution to our war effort!"

A lot of serious thought, careful testing in the field and scientific know-how (besides some top quality raw materials!) have gone into HELSPOT. We've been proud of the service records it has been making in plants where it is being used.

HELSPOT has been given a thorough baptism of fire, on the job, by Foundrymen the country over. Many have suggested new and practical uses for HELSPOT in the metallurgical industry.

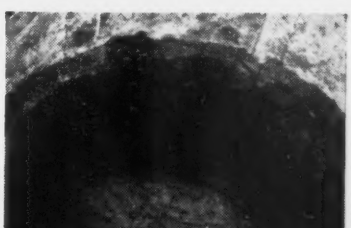
If you are not now using HELSPOT we invite you to test it in your own plant. And . . . why not ask your Foundry friends about their success with HELSPOT?

☐ **HELSPOT is packed in 100-lb. water-proof cartons, already sliced for ease of handling.**

☐ **HELSPOT DRY is available for those who prefer a dry material, to be mixed on the job. Shipped in 100-lb. bags.**

1. Tamp in bottom, leaving a trench around outside edge.

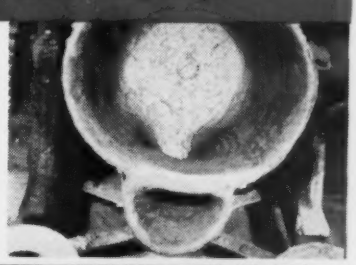
2. Place slices solidly in trench to provide sealed joint.



3. Form joints where lines will together, forming valley.

4. Tamp narrow strips into valleys to seal joints tightly against metal penetration.

5. Taper top edge, keep it filled between sidewall and bottom to form a tight seal.



6. Form pouring lip, build bridge to form skimmer. Roughen entire lining surface.

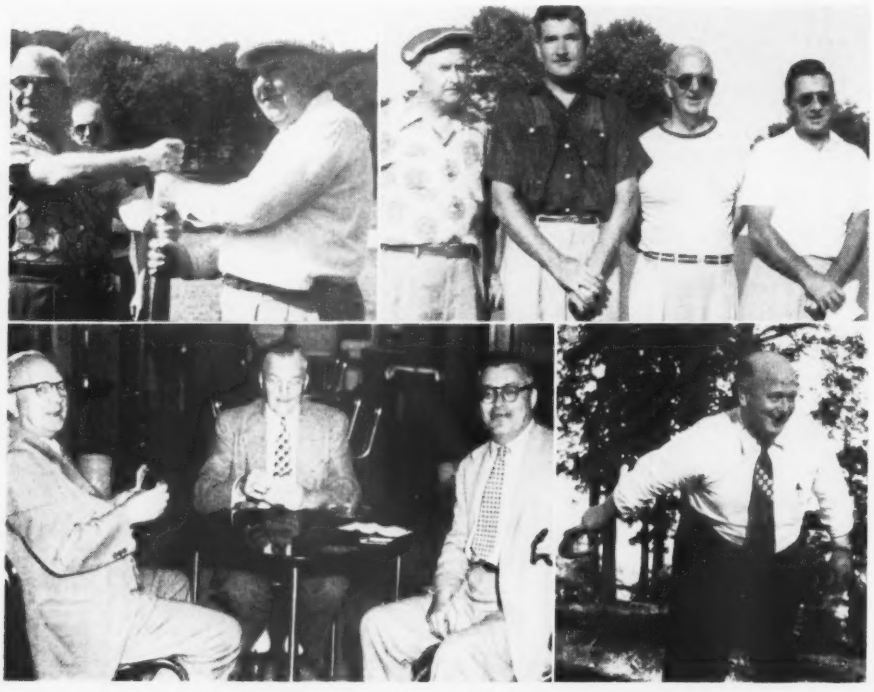
MEX-R-CO BETTER REFRACTORIES

Mexico Refractories Company
Mexico, Missouri
Affiliate: National Refractories Co., Lewis Tower Bldg., Philadelphia, Pa.

(*Continued from page* 208)
visor. The speaker suggested the following plan of attack against accidents. Set up a formal safety program. Select a man who is capable to head up the program. Recognize that such a program is a training program and that the objective can be reached by the safety leader working through the supervisors. It is the responsibility of the safety man and the supervisor to analyze each operation to detect causes of accidents and then work to remove them.

A check of past records will reveal hazardous jobs and furnish clues as to where to start the safety program. Mr. Davis concluded by stating that hazardous conditions fall into three categories: Those which can be solved immediately, such as unguarded machinery or poor housekeeping conditions; those not possible to solve immediately or requiring major work to correct—usually known hazards that should be identified or labeled to call workers' attention to them; and hazardous work methods whose solution lies in training. Here the key man is the foreman. He must be sold on safety, must work safely himself and must teach and enforce safety.—*Harold R. Wolfer, Puget Sound Naval Shipyard*

PHILADELPHIA Chapter of the AFS met on Oct. 9 to honor the founder of the chapter, William B. Coleman, president, William B. Coleman & Co., Philadelphia. Top, left to right, are Mr. Coleman; William Morley, Olney Foundry Division, Link-Belt Co.; and Clyde B. Jenni, General Steel Castings Co. The views below illustrate some of the forms of recreation enjoyed by 500 members and guests who attended the chapter's outing at the Manufacturers Golf and Country Club on July 24. Photographs are by Leo Houser, Dodge Steel Co.



Philadelphia

MORE than 200 members were present at the Oct. 9 meeting of Philadelphia Chapter of AFS to honor William B. Coleman, president of William B. Coleman & Co., Philadelphia. Mr. Coleman, was one of the organizers of the chapter, served two terms as its first chairman. Since that time, almost 20 years, he has been its secretary-treasurer. Present for this testimonial dinner were all of the chapter's past chairmen and also one of Mr. Coleman's good friends, George F. Pettinos, Pettinos Co. Inc., who is 92 years of age.

As a continuing honor to Mr. Coleman's contribution to the Philadelphia Chapter, it was announced that a scholarship had been established, known as the William B. Coleman award, and will be awarded annually.

After dinner the group divided into three sections, main topic of each being "Melting Practice." The gray iron session was conducted by Lewis H. Gross, American Radiator & Standard Sanitary Corp., Baltimore. Technical chairman was Henry Winte, Florence Pipe Foundry & Machine Co., Florence, N. J.

Brass and bronze session was conducted by Harry Ahl, Down River Casting Co., Rockwood, Mich. Daniel Best, superintendent of the brass foundry, Bethlehem Steel Co., Bethlehem, Pa., served as technical chairman. Speaker at the steel session was John Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa., and E. H. Berry, Dodge Steel Co., Philadelphia, was technical chairman.

The Feb. 12 meeting of the chapter, to be held at the Engineers Club, Philadelphia, will feature Ralph White, International Nickel Co. His subject will be "Melting of Nodular Iron in Basic-Lined Cupolas."—*Charles R. Sweeny, Atlantic Steel Castings Co.*

Connecticut Non-Ferrous

USE of copper oxides to prevent gas porosity was discussed by L. G. Klinker, chief engineer, Chemicals-Pigments-Metals Division, the Glidden Co., at the Oct. 21 meeting of Connecticut Non-Ferrous Foundrymen's Association. The meeting was held at the Waverly Inn, Cheshire, Conn.

Mr. Klinker pointed out that by keeping an excess of oxygen in the melt and then deoxidizing with phosphor copper just prior to pouring, gas porosity can be eliminated to a great extent. The speaker then discussed various methods of maintaining an oxidizing atmosphere during melting.

Copper oxides for this purpose are

(*Continued on page* 212)

Their ...Lectromelt* Furnace gives them

3 Extra Heats a Day...

A CQT Lectromelt Furnace keeps right up with the foundry at Omaha Steel Works operating at 25% to 30% over capacity for which it was designed.

At Omaha Steel they laid out the foundry to produce five heats per day. Then, they proceeded to operate at 25% to 30% over capacity. Their Lectromelt Furnace keeps pace with above-capacity production, averaging eight heats per day.

Lectromelt Furnaces are known for their ability to take on extra work when you must meet demanding schedules. Even when handling higher power loads and while turning out extra tonnage, a Lectromelt still gives trouble-free performance.

Metals melting is easier and more profitable when you use Lectromelt Furnaces because additional ruggedness and dependability are engineered into each furnace while it's in the design stage. You get a sturdy furnace with these added advantages:

1. Precise temperature and analysis control.
2. Top-charging to save man-hours, power, electrodes and furnace lining.
3. Power supply and regulation equipment specifically engineered and built to fit each installation.
4. Counterbalanced electrode arms.
5. Separately mounted roof lift and swing mechanism.
6. Side-mounted tilting mechanism.
7. Each furnace is assembled in our factory prior to delivery.

Write for our catalog No. 9. It describes all types of Lectromelt Melting Furnaces and their operation. Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... Lectromelt

(*Continued from page* 210)

either cupric (black, CuO_2) or cuprous (red, CuO) and are furnished in fine-mesh form. They react quickly to give the melt a reserve of oxygen that prevents absorption of hydrogen or other gas-forming agents. An article on copper oxides by Mr. Klinker was published in the September, 1953 issue of FOUNDRY, p. 228. —*John V. McCarthy, North American Smelting Co.*

Detroit

LATEST developments in foundry equipment in England were discussed by Austin S. Beech, chairman and managing director, Foundry Equipment Ltd., Bedfordshire, England, at the Oct. 15 meeting of Detroit Chapter of the AFS. Approximately 160 foundrymen were in attendance. Harry E. Gravlin, Ford Motor Co., and chapter chairman, presided.

Mr. Beech presented a film showing British equipment in operation. He believes much is to be gained by a free flow of information among foundrymen of all nations. His tour of the United States was to disseminate ideas and to pick up new ones. —*Floyd Lawrence*

Wisconsin

ANNUAL management night of Wisconsin Chapter of the AFS was held Oct. 9. Featured speaker was Dr. Paul J. Mundie whose address was entitled "Personal Factors in Supervisory Success." Dr. Mundie stated that "Foundry work remains an art . . . and the art left in the foundry business is too vital to be lost." He went on to discuss the importance of the role foremen play in successful foundry operation.

Chairman A. F. Pfeiffer, Allis-Chalmers Mfg. Co., announced the chapter will hold its annual Christmas party on Dec. 11 at the Hotel Schroeder.—*John E. Hubel*

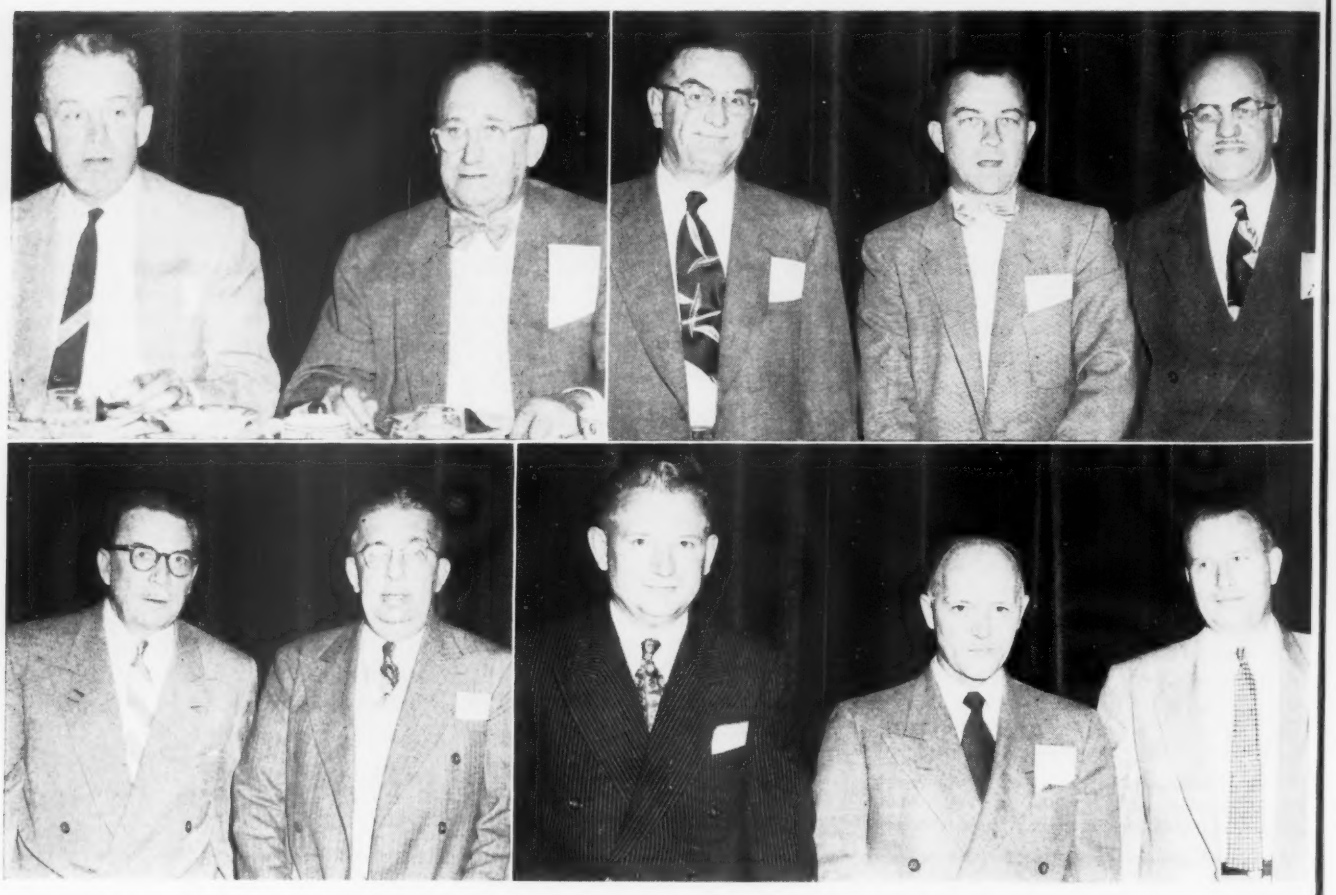
Chesapeake

THIRD annual casting improvement seminar of Chesapeake Chapter of the AFS was held Oct. 23-24. During the business meeting, it was announced that the chapter's oyster roast would be held in January. Also, the foundry library was presented to the Mergenthaler Technical High School, cast metals division, by Lewis H. Gross, on behalf of the Chesapeake Chapter. W. J. Hucksull represented the Baltimore Board of Education.

During the technical session, the technical staff of the New Jersey Silica Sand Co., described "What the Sand Producers of Today Are Doing To Supply Better Sands for the Castings the Foundry Will Produce Tomorrow." S. A. Wick discussed the geological development of sand formations in the southern New Jersey area, followed by a movie on the mining and processing of sand for industry. C. W. Thompson served as narrator and D. J. Jones gave a lecture on foundry sands.

Discussions on finishing of castings was held Saturday morning. W. E. Gordon, Linde Air Products Co., described "How the Proper Use of Burning and Welding Will Make Your Castings More Saleable."

(*Continued on page* 215)



WISCONSIN Chapter of the AFS met Sept. 11. View at top left shows, from left to right, J. A. Risney, Risney Foundry Supply Co., and A. F. Pfeiffer, Allis-Chalmers Mfg. Co., to whom Mr. Risney turned over the chairman's gavel. The other views show some of the persons present at the Oct. 9 meeting, held in honor of management. From left to right are E. N. Carpenter, Carpenter Bros., R. J. Stevenson, Whitewater Mfg. Co.; E. C. Westover, Westover Engineers; Paul J. Mundie, Ph. D., speaker; D. E. Zuege, Sivyer Steel Casting Co.; Joseph G. Kropka, Chain Belt Co.; C. P. Fuerst, Falk Corp.; and H. W. Schwengel, Modern Equipment Co. Photographs by courtesy of Walter V. Napp, Delta Oil Products Co.

Republic, the only producer of a complete line of merchant pig irons, offers you a field metallurgical service staffed by a group of highly skilled Pig Iron Metallurgists.

The job of the Republic Pig Iron Metallurgist is to help you solve foundry problems or to furnish answers to questions on molding practice. Frequently he is called in to make a routine foundry survey. His recommendations and suggestions often result in improved plant operation, increased production efficiency and unit output with no increase in overhead costs.

Why not join the hundreds of foundries, large and small, that regularly keep in touch with the Republic Pig Iron Metallurgist? There's no cost or obligation for his service.

Write, wire or phone us when you would like him to call at your plant.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

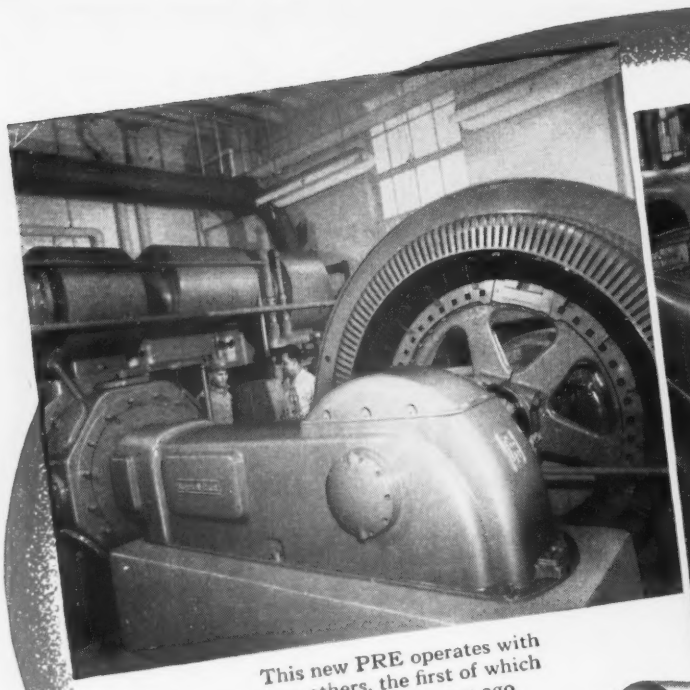
Republic **PIG IRON**

"CHATEAUGAY" Low-Phosphorus, Copper-Free

"REPUBLIC" (Northern) Foundry, Basic and Malleable

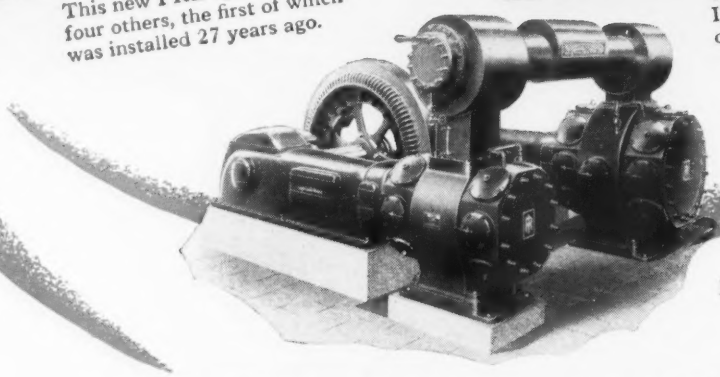
"PIONEER" (Southern) Foundry and Basic

REPUBLIC STEEL



This new PRE operates with four others, the first of which was installed 27 years ago.

Typical application is I-R size 504 Air Impactool on deck lid hinges.



PRE sizes 300 to 3000 horsepower.

HUDSON MOTOR COMPANY HAS SELECTED PRE COMPRESSORS SINCE 1925

Air Capacity of Gratiot Plant is now 13,200 cfm at 100 psi

When a fifth Ingersoll-Rand PRE Compressor went into operation recently, the Gratiot Plant of the Hudson Motor Company boosted its compressed air capacity from 10,000 cfm to 13,200 cfm. Thousands of air-operated tools, welders, paint sprayers and presses on the Hudson assembly lines set the pace which required this additional air capacity. The newest PRE operates along with four older PRE synchronous-motor-driven compressors. The first one was installed 27 years ago and is still going strong.

This is only one example of the dependability and reliability for which Ingersoll-Rand PRE Compressors are known. They are heavy-duty machines built for full-load service wherever large volumes of air or gas are to be handled. The two-cylinder design is standard on sizes up to 1000 horsepower. The 4-cylinder or so-called "4-corner" design is used on the larger sizes up to 3000 horsepower.

For the full story on the PRE, consult your nearest I-R representative.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 763-1

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

(*Continued from page 212*)

A movie, "Friction Sawing," was presented by the Baltimore Do-All Machine Co., and "Proper Selection of Grinding Wheels Will Make Your Castings More Saleable" was discussed by M. E. Hawkins, Atlantic Abrasive Corp.—*Henry M. Witmeyer, Foundry Service & Supply Co.*

Central New York

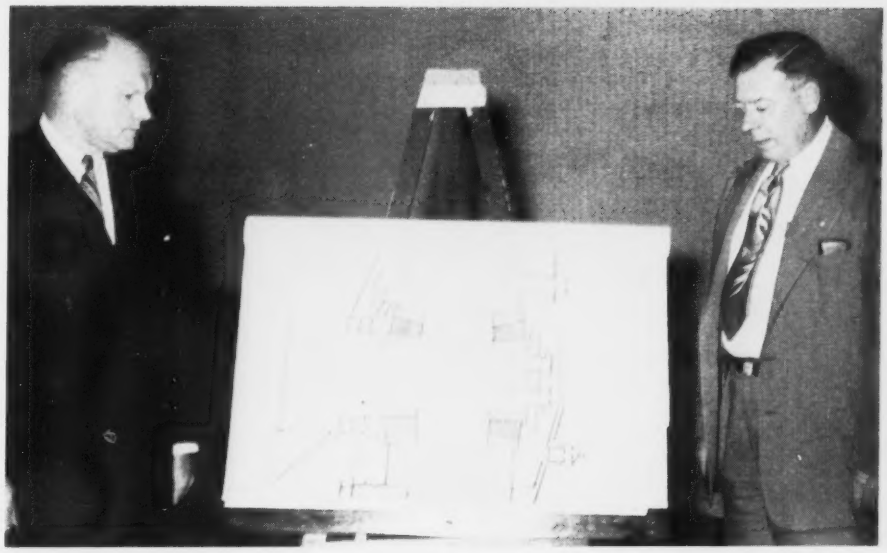
A DISCUSSION of refractories attracted 115 members and guests to the Oct. 9 meeting of Central New York Chapter of AFS. Foundrymen from the Elmira area served as hosts as the group gathered at the Mark Twain Hotel, Elmira, N. Y.

Speaker was D. W. Wuerthele, A. P. Green Fire Brick Co., Mexico, Mo., assisted by Ralph Denton, R. J. Denton Co., Syracuse, N. Y. In a brief discussion of refractories, Mr. Wuerthele pointed out that the refractory industry is the most basic industry next to agriculture. An interesting film was shown, entitled, "Master of Fire—Servant of Industry." It illustrated the many types of refractories available to foundrymen and indicated that, through proper selection, refractories will provide maximum service and reduce melting costs.—*Bruce R. Artz, Pangborn Corp.*

Mo-Kan

OCTOBER meeting of Mo-Kan Chapter of the AFS was held at the Fairfax Airport dining room, Kansas City, Kans. A good representation of members was present to hear David Johnson, foundry research laboratory, Archer-Daniels-Midland Co., describe the "D" process for shell molding. (See FOUNDRY, July 1953, p. 169.)

The annual Christmas party of the chapter for members, their ladies and guests will be held Dec. 4 at the ballroom of the President Hotel, Kansas City, Mo.—*C. W. Boettcher, Black, Sivalls & Bryson Inc.*



ROCHESTER Chapter of the AFS held its first meeting of the 1953-54 season on Oct. 6. Left to right are Speaker R. L. McIlvaine, vice president, National Engineering Co., Chicago, with one of the drawings he used in his talk, and Chapter President Neal F. Clement, Rochester-Erie Foundry Corp.

Rochester

SPEAKER for the opening meeting of the 1953-54 chapter year for Rochester Chapter of AFS was R. L. McIlvaine, vice president, National Engineering Co., Chicago. His topic was "Mechanization in the Small Foundry." The meeting was held at the Seneca Hotel, Rochester, N. Y. on Oct. 6.

Mr. McIlvaine stressed the importance of determining the production goal sought through mechanization. Installation of equipment must be consistent with that goal since one foundry may be happy with 40 molds per hour while another organization may want 80 molds per hour.

With mechanization, consideration should be given first to the melting schedule, type of work and alloys to be used. Next, storage of sand, type of bins, and delivery of proper amounts of conditioned sand to each operator should be studied. Mr. McIlvaine stated attention should be given to the handling of sand, its proper blending and storage so that it will reach the operators with proper bond and temper.—*H. G. Stellwagen, Hetzler Foundries Inc.*

Tennessee

ON Oct. 16, 85 members of Tennessee Chapter of the AFS attended the opening meeting of the current chapter year at Hotel Patten, Chattanooga. Speaker was Joseph S. Schumacher, chief engineer, Hill & Griffith Co., whose talk was entitled, "Fool-Proof Sand."

SOUTHERN CALIFORNIA Chapter of the AFS met Oct. 9 for "An Open Discussion on Problem Castings." From left to right are Arthur Rau, Snyder Foundry Supply; Gordon Sondraker, Gordon Sondraker Co.; Fred Dye, Burndy Engineering Co.; Paul Waters, South Gate Aluminum & Magnesium Co.; and William Richmond, William Buckley, W. Griffith, R. Domonick, M. Gittleman, J. Baron and F. Guerra, Pacific Cast Iron Pipe & Fitting Co. Photographs are by courtesy of K. F. Sheckler, Calmo Engineering Co.

METROPOLITAN Chapter of the AFS met Oct. 5 at the Essex House, Newark, N. J., and was addressed by Dr. William S. Sadler Jr., Sadler & Associates, Chicago, who spoke on "Success and Happiness." From left to right are Chapter Chairman Bernard Ames, New York Naval Shipyard; Dan Polderman Jr., Whiting Co., who received a citation from the chapter for his excellent work as treasurer; Dr. Sadler; and Charles Schwalje, Worthington Corp. Photographs are by courtesy of John Bing, Metropolitan Refractories Corp.

Mr. Schumacher described the results of three years' development work which resulted in a four-screen combination of lake and bank sand. He said the sand is highly flowable, produces sharp casting definition and a smooth casting. The sand is now being used successfully by 30 foundries.

W. P. Delaney, Eureka Foundry Co., and chapter chairman, introduced 11 new members.—*W. F. Hetzler*

Ontario

A TWO-YEAR foundry course, sponsored by the Ontario Chapter of AFS and prepared by members of the chapter was inaugurated Oct. 5 at Guelph Collegiate, Guelph, Ont. Present at the first meeting were F. J. Rutherford, Refractories Engineering & Supplies Ltd., vice chairman of the chapter; and John Allan, Callander Foundry & Mfg. Co., Guelph, and D. B. Herbison, Massey-Harris "M" Foundry Division, Brantford, vice chairmen of the educational committee.

On Oct. 6 in Toronto, Alex Pirrie, Standard Sanitary & Dominion Radiator Ltd., chapter chairman, and N. L. Bennett, Canadian General Electric Co., vice chairman of the educational committee opened the first session of the course at Western Technical School in Toronto.

The course covers all aspects of foundry operation and management, and consists of 22 lectures to be given each year. The prepared lectures will be given by the author of that lesson, all of whom are men actively engaged in the industry in Ontario. At Guelph the following subjects are being given: Blueprint reading, patterns, molding, coremaking, safety and hygiene, nonferrous melting and metallurgy, gating and risering. The Toronto course will include discussions on sand, cleaning castings, safety and hygiene, ferrous melting and metallurgy, refractories, casting defects, costs.

For the sake of efficiency and so that all students may receive the greatest benefit, not more than 50 to 60 students can be accommodated in any one class. At both Guelph and Toronto, more than 100 applied for enrollment.—*C. E. Maddick, Massey-Harris Co. Ltd.*

SAGINAW VALLEY Chapter of the AFS opened its 1953-54 season with a meeting on Oct. 1 which was attended by 200 members and guests. Those present included, from left to right, Speaker James H. Smith, Central Foundry Division, General Motors Corp.; Chapter Chairman F. J. McDonald, Central Foundry Division; Chapter Vice Chairman Woodrow W. Holden, Foundry Division, Eaton Mfg. Co.; and National AFS Director Edward C. Hoenicke, Eaton Mfg. Co.

St. Louis

MORE than 100 members and guests of St. Louis District Chapter of the AFS were present at the Oct. 8 meeting at which James R. Allan of International Harvester Co., Chicago, was the featured speaker. In addition, Hans Heine, Herbert Scobie and William Davis of AFS national headquarters were guests.

Mr. Allan, manager of International Harvester's Industrial Engineering and Construction Department, chose for his topic "Guide Posts to Better Foundries." Problems which most heavy industry must face, and particularly the foundry industry, include employee safety, air pollution, noise, 24-hour operations and traffic and parking congestion. He believes one of the answers to these problems lies in the establishment of industrial districts isolated from all residential areas and surrounded by buffer zones. Here industry would be free from the restrictions of zoning regulations.

J. R. ALLAN

Mr. Allan pointed out pressure is being put to bear in many states for the passage of legislation regulating industry in the fields of employee health and safety. Additionally, anti-air pollution ordinances exist in practically all metropolitan areas. If the small employer does not attempt to remedy the situation, he will find himself doing so under close government control.—*J. R. Bodine Jr., Bodine Pattern & Foundry Co.*

Eastern Canada

THIRD Maritimes meeting of Eastern Canada Chapter of the AFS was held at the Admiral Beatty Hotel, St. John, N. B., on Sept. 25 and 26. George McAvity, vice president, T. McAvity & Sons Ltd., was chairman.

(*Concluded on page* 218)

FACTS Prove It!

Remove More Metal AT LOWER COST

360 CYCLE HIGH FREQUENCY ELECTRIC GRINDERS

Examine the facts and figures, or prove it for yourself with a demonstration in your own shop:

THOR 360 CYCLE GRINDERS remove metal faster—through constant high speed under load. Simple, rugged, reliable 3-phase induction motors provide this margin of bonus speed and production.

Judge Thor 360 Cycle economies from your own records: *without obligation*, Thor will loan demonstrator models to you, complete with 360 cycle converter if necessary. This is a *FREE SERVICE* to the industry, completely without obligation. Write Thor Power Tool Company, Aurora, Ill. Sales and Service Branches in Principal Cities.

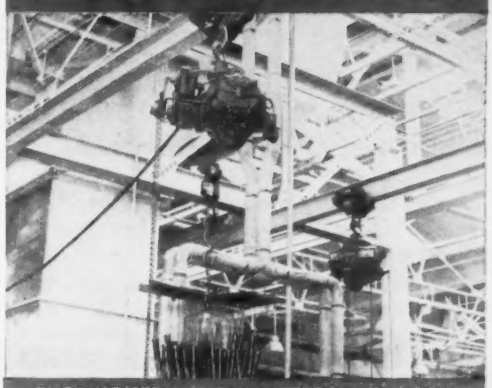
Thor AIR AND ELECTRIC TOOLS

TOOL MAKERS FOR SIXTY YEARS

THOR GRINDERS feature fast, powerful action for grinding or wire brushing . . . choose from over 100 air, universal electric and high frequency models.

THOR AIR HAMMERS AND RAMMERS speed chipping, scaling, core busting and ramming operations . . . famous for power and rugged durability . . . 16 models.

THOR IMPACT WRENCHES meet pattern shop requirements for fast tear-down and assembly . . . tighten or loosen nuts in seconds. Air and electric models.



THOR HOISTS AND BALANCERS handle raising, lowering or suspension of work or equipment . . . your choice of 11 air hoists for loads from 500 to 6000 pounds . . . 36 balancers for loads to 300 pounds.

(*Concluded from page* 216)

of the meeting and the company served as host.

At the opening luncheon, Harry Hopkins, who spoke on behalf of the mayor of St. John, presented some interesting historical details on the founding of the city. A number of the members visited the McAvity plant on Friday afternoon and were interested in the modernized equipment recently installed in the brass and bronze foundries.

A technical session and open forum was held Friday evening. First presented was the film, "Mechanization of Core Making," produced by the Beardsley & Piper Division, Pettibone Mulliken Co., Chicago. George McAvity then discussed "Practical Methods of Cast-High-Strength and Pressure-Tight Aluminum Castings." He dealt with the production of aluminum valves to meet naval specifications in two aluminum alloys and covered selection of sands, molding practice and heat treatment.

The second paper was given by James Grieve, foundry superintendent, Dominion Engineering Works Ltd., Montreal. It was entitled "A Review of Molding Methods in Iron and Steel Foundries in Europe," and was based on his observations of 13 foundries, five in France, two in Switzerland, two in Belgium, three in Germany and one in Norway.

On Saturday morning, three papers were presented at a session whose general topic was "Unusual Ideas for Pattern and Corebox Equipment." William C. H. Dunn, Western Pattern Works Inc., Montreal, described "Use of Plastics in Pattern Equipment." Clarence R. Dutton, superintendent of foundries, Crane Ltd., Montreal, spoke on "Production of Metal Patterns by Shell Mold Process." The concluding paper was "Use of Rubber in Pattern Equipment," and was prepared by John Hodgkiss, process inspector, Canadian Car & Foundry Co. Ltd., Montreal.—*W. J. Brown, Robert W. Bartram Ltd.*

The scenes above were glimpsed at the Purdue Metals Casting Conference, Oct. 29-30, at Purdue University, West Lafayette, Ind. Left to right, top view, are C. T. Marek, associate professor of general engineering and director of foundry education, Purdue, who was cochairman; J. A. Barrett, assistant general superintendent, National Malleable & Steel Castings Co., Indianapolis, chairman; J. P. Lentz, assistant works manager, International Harvester Co., Indianapolis; and V. S. Spears, district manager, American Wheelabrator & Equipment Corp., Mishawaka, Ind., program manager. Mr. Lentz assisted Mr. Spears. In the center is a scene at the conference dinner, and the bottom shows Frank Dost, president, Sterling Foundry Co., Wellington, O., vice president of the AFS, as he addressed the opening meeting of the conference. For other details, see story beginning on page 190, this issue

Cleveland Non-Ferrous

ANNUAL clam bake of the Cleveland Chapter of the Non-Ferrous Founders' Society was held at Bessie Miller's Broadview Club on Oct. 23. As a special attraction, the chapter invited the wives of members and guests to attend as their guests. More than 90 members and guests with their wives were present to enjoy a fine dinner. Strolling musicians provided entertainment.—*Walter O. Larson Jr., Grafton Foundry Co.*

Saginaw Valley

TWO hundred members and guests of the Saginaw Valley Chapter of AFS opened the current chapter year on Oct. 1 at Fischer's Hotel, Frankenmuth, Mich. Principal speaker was James H. Smith, general manager, Central Foundry Division, General Motors Corp., who presented excerpts from his 1953 Charles Edgar Hoyt lecture and films showing "Shell Molding" and "Foundry Better Methods." Mr. Smith's lecture was published in the August 1953 issue of FOUNDRY starting on page 100.—*Roy S. Dahmer, Eaton Mfg. Co.*

SOMEDAY . . . *it will be for real!*

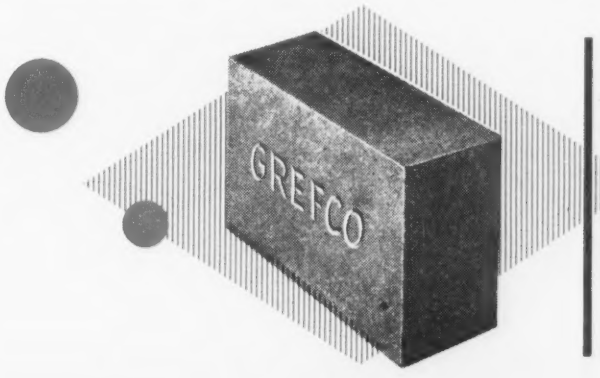
Building with blocks is as much a part of a young boy's life as baseball will be in his teens. Blocks—one on top of the other—to satisfy the typically male urge to create.

As the years roll by, this boy will go on to build bridges or buildings, to make his career in the laboratories of chemical research—or to watch steel being born from ore and earth.

Whatever his future, there will be refractory brick to help him do his job. Blocks of brick to line the furnaces and heat containing vessels—in virtually every step of industry.

There would be no processed raw materials, no production, no living such as we know it but for refractory products which Grefco furnishes in quality and quantity to keep the nation on the move.

To the boy above, a very Merry Christmas and a great many Happy and Prosperous New Years. In his hands lies the future of America.



GENERAL REFRACTORIES COMPANY
Philadelphia

SUCCESSFUL NEW ENGLAND CONFERENCE

Covers Wide Range of Foundry Interests

By ROBERT H. HERRMANN
Associate Editor

NEW England's 13th Regional Foundry Conference, held Oct. 23-24 at Massachusetts Institute of Technology, drew a record 435 registration. The conference was opened by Frank R. Elliot, Westinghouse Electric Corp., Springfield, Mass., who introduced Adm. C. L. Cochrane, MIT Dean of Engineering. In his welcoming address, Admiral Cochrane spoke of the close relationship between schools of engineering, science, management and the humanities at MIT in its effort to offer a well rounded educational program to students.

Technical sessions were divided into three general meetings, three ferrous and three nonferrous meetings, with a shell molding machine demonstration by Production Pattern & Foundry Co. personnel in the Sloan Metal Processing Laboratory student foundry at conclusion of the sessions. The conference dinner on Friday evening featured a talk by George "Birdie" Tebbetts, manager of the Cincinnati baseball team and former catcher with the Boston Red Sox, Detroit Tigers and Cleveland Indians.

George E. Miller, Osborn Mfg. Co., Cleveland, discussed "Maintenance of Molding Machines and Core Blowers" at the first general session. C. W. Hutchins, Standard Foundry Co., Worcester, Mass., was chairman, with Lawrence J. Litalien, Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn., as co-chairman.

Mr. Miller devoted his talk to molding machines and core blowers, saying that maintenance principles are applicable to all types of foundry equipment. He stressed the point that a foundry in reality never buys a piece of equipment but rather its production capacity. Every piece of equipment has a potential sales dollar value based on its production capacity and the dollars it can earn for a foundry. Consequently downtime on any machine resulting in loss of tonnage means a loss in sales dollars.

In outlining proper maintenance techniques the speaker stated that machines should be operated within the capacity for which they were designed. Machines should be installed properly, and maintenance men should be familiar with how every machine is constructed and operated before they work on it. Adequate stocks of repair parts should be maintained; in some cases spare machines are advisable. Lubrication should be a regularly scheduled routine, the use of automatic lubricating devices being preferable.

Regular visual and operational inspections plus periodic overhauls are a must, and the keeping of a record of inspections and repairs for all machines was advised.

The second general session featured a discussion of "Foreman Training in the Foundry" by John W. O'Toole, Crompton & Knowles Loom Works, Worcester, with Raymon F. Meader, Whitin Machine Works, Whitinsville, Mass., chairman and Paul T. Mongeau, Joy Mfg. Co., Claremont, N. H., as co-chairman.

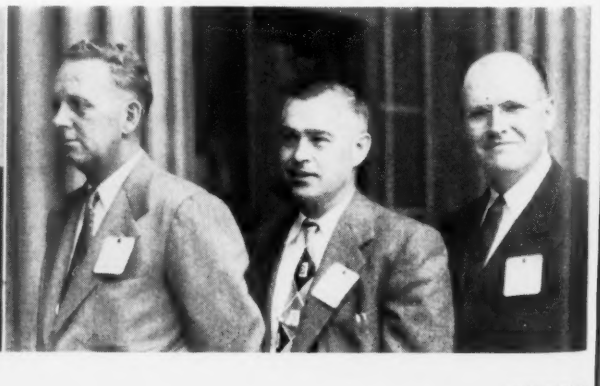
In detailing the foreman training program at his company Mr. O'Toole stated that it was based on the assumption that foremen want to do a good job and should do a good job. Primary thesis of instruction is to create the correct attitude in the foreman so that he will do the same with his workers. Stress is laid on establishing the correct working environment—getting employees started on the time and performing their work according to company rules every day.

Specific instructions are given for the accomplishment of every detail of each foreman's job, and every phase of the union contract is interpreted and explained. Foremen are given a pocket-size kit containing pencil and paper, a copy of the union agreement, names and phone numbers of men to contact for help in any problem, a statistical history of each worker in the foreman's department and an organizational chart of the company.

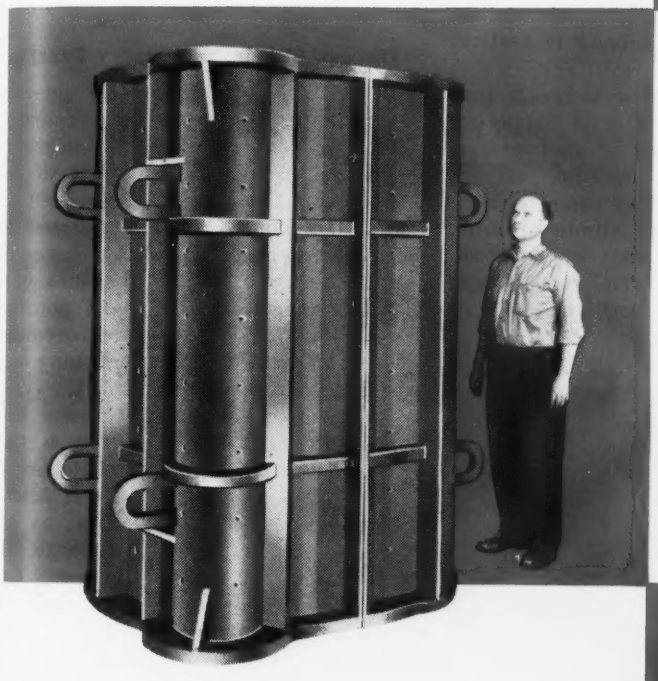
"Sand Control in Relation to Casting Finishes" was the paper presented at the third general session

(*Continued on page* 222)

Left, left to right, are: Raymon F. Meader, Whitin Machine Works, and Frank R. Elliot, Westinghouse Electric Corp., conference chairman. Below, left, Ray Hunter, Archer-Daniels-Midland Co., fourth from left and his committee in charge of the foundrymen's post-conference smoker; at right, chairmen of the last three conferences. Left to right: Henry G. Stenberg, Draper Corp.; Joseph B. Stazinski, General Electric Co., and Howard B. Nye, Crompton & Knowles Loom Works. Photos courtesy of C. A. Wyatt, Debevoise-Anderson Co.



These Three SHANAFELT FLASKS tell a story of importance to any user of heavy duty flask equipment



Four section flask with total weight of 10,152 lbs. Sidewalls and bars 1/2" thick. Flanges 1" x 5" with channel reinforcement.

Unusual shape and construction—for casting ingot molds. 1/2" sidewalls, 2" x 5" flanges. Weight 6,414 lbs.

Six section flask with bottom plate, loaded for shipment. Flask made with 1/2" material. 1" x 3" flanges and a 3/8" channel specially formed to give strength to the shallow 6" sections. Total weight 16,620 lbs.

The modern SHANAFELT plant is equipped for making steel flasks in any style, size, and shape.

Just tell us about the flask you need and SHANAFELT engineers and sales representatives will work out the construction details and give you estimates of cost, weight and delivery.

The SHANAFELT Manufacturing Co.

ESTABLISHED 1893

2600-2700 WINFIELD WAY N. E. • CANTON, OHIO

(*Continued from page* 220)

by Martin Pepper, Whitehead Bros., New York. Chairman and co-chairman, respectively, were William N. Ohlson, Draper Corp., Hopedale, Mass., and Gustav A. Pinkul, General Electric Co., Lynn, Mass.

Three requirements, according to the speaker, determine casting finish: It must be such that the foundry is proud of it; the customer must be happy with it, and it should be economical to produce. Although grain size affects casting finish, it is not as influential as facing material. Handling of facing material, however, presents a dust problem which can be controlled mechanically or chemically. In the speaker's opinion, mechanical methods are undesirable because they remove fines in the sand. On the other hand, chemical treatment of materials such as seacoal and bentonite reduces scatter of the material and, consequently, dust.

Advantages and disadvantages of natural and synthetic sands were outlined, and it was pointed out that careful consideration be given to proper sand grain distribution because it can vary greatly for sands of the same AFS fineness number. Results of tests to improve casting finish with various sands and facings were described.

At the first nonferrous session George J. Jackson, Walworth Co., Boston, spoke on "Some Aspects of Shell Molding in the Nonferrous Foundry." Stafford W. Chappell Jr., General Dynamics Corp., Groton, Conn., was chairman, with Frederic B. Duncan, William Duncan Co., East Boston, Mass., as co-chairman.

Mr. Jackson opened with the statement that the greatest opportunity for improvement in the shell molding process lies in blending the sand-resin mix and in making the shells. He advocates the use of completely enclosed mixing equipment if powdered resins are used. However, he considers liquid resins more desirable and suggests the use of a wetting agent when they are used. All resins should provide good flowability to help eliminate porosity in vertical surfaces of shells.

He has found gluing to be the best method of fastening mold halves together and the use of shot preferable as a back-up material. He advocates using strainer cores for nonferrous castings to eliminate dross and reduce the velocity of metal entering the mold. To reduce mold and core erosion in bottom mold cavities he uses a tapered sprue with a well at the bottom plus an upgate from which ingates on a horizontal plane lead to the mold cavities.

In discussing casting soundness, Mr. Jackson stated that he has found no evidence that resin in the mold causes gassing of castings. Gassing is due to improper melting and pouring. Experience at Walworth also has shown a yield of 63-65 per cent in the shell molding operation.

Second paper at the nonferrous sessions was "Aluminum Sand Foundry Practice" by Ward D. Stewart, Aluminum Co. of America, Pittsburgh, with Frank G. Volpe, Somerville Machine & Foundry Co., Somerville, Mass., as chairman and John S. Barros, And-Bar Non-Ferrous Foundry, Taunton, Mass., co-chairman.

Discuss Aluminum Foundry Practice

Mr. Stewart presented a general outline of aluminum sand foundry practice, commenting briefly on methods and equipment applicable to the following phases of work: Melting and handling of molten aluminum, alloy composition control, avoidance of gas pickup, temperature measurement, fluxing, transfer and pouring techniques, sand practice, coremaking, gating and risering, cleaning and finishing, and heat treatment.

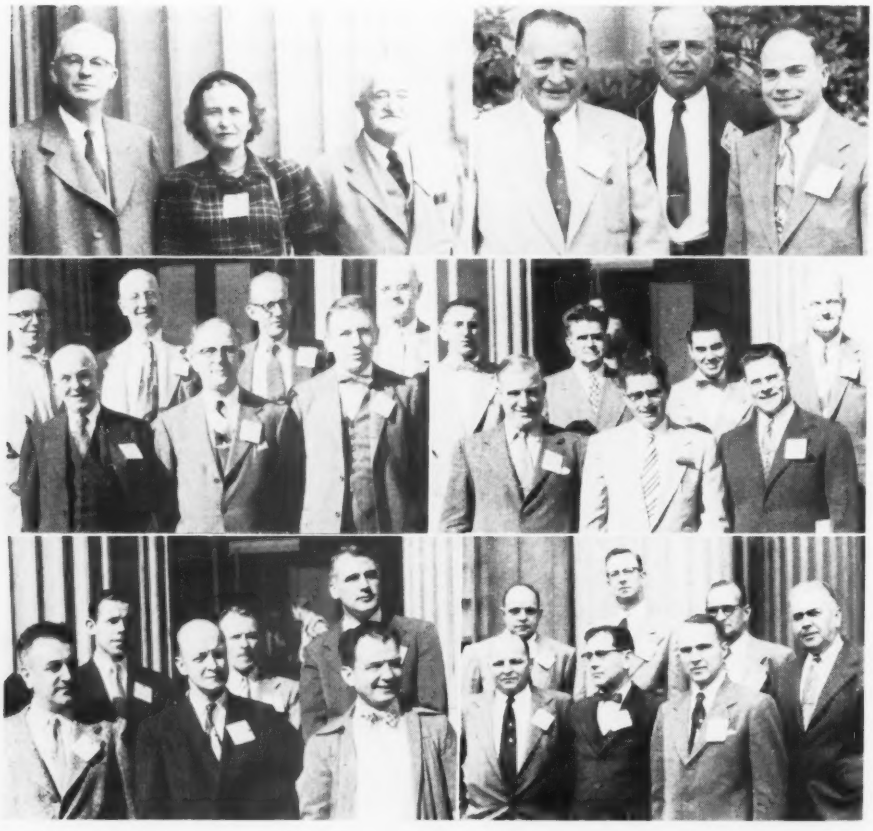
Concluding nonferrous session had Walter Clark, D. W. Clark & Co., Boston, as chairman and Robert I. Sheldon, Springfield Bronze & Aluminum Co., Springfield, Mass., as co-chairman. William B. George, R. Lavin & Sons Inc., Chicago, discussed "Why Castings Are Lost."

The speaker confined his discussion to the tin and manganese bronzes, stressing the need of proper gating to obtain directional solidification at a uniform rate of speed. A different problem occurs with the two alloys because tin bronze has a dendritic structure which freezes from the casting surfaces to the center; solidification of manganese bronze is characterized by equi-axed dendrites which form throughout the casting during freezing.

He described proper gating methods to achieve soundness in a number of typical castings in each alloy.

At the first ferrous session Howard H. Wilder, Vanadium Corp. of America, Detroit, presented "A Summary of Recent Developments in the Foundry Industry." Clyde Lake, Hyde Windlass Co., Bath, Me., was chairman and Felton C. Perkins Jr., Henry Perkins Co., Bridgewater

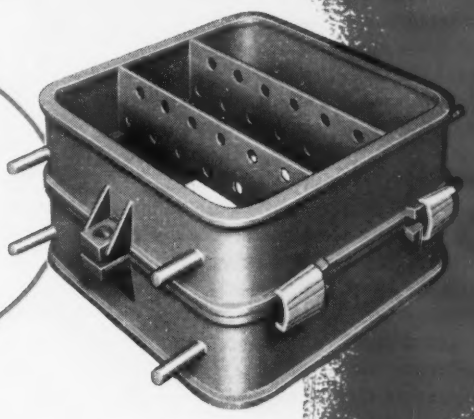
(*Concluded on page* 224)



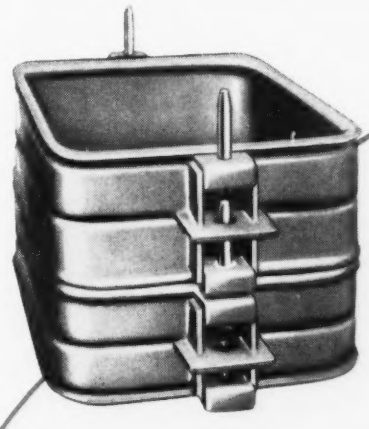
Some of the groups attending the conference from various foundries were: Left to right, top: Windsor Foundry Corp. and Somerville Machine & Foundry Co. Center: Whitin Machine Works and Whitman Foundry Inc. Bottom: Pioneer Foundry & Mfg. Co. and Standard Foundry Co. Photos courtesy of C. A. Wyatt

EATON RAPIDS 2851

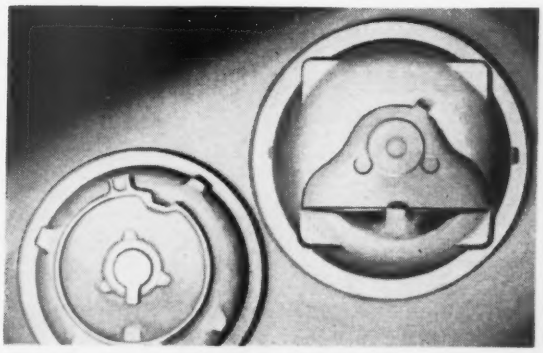
Jot it down on your memo pad . . . memorize it . . . or simply reach for your phone and call it. It's your key to a ready source for quality flasks and plastic patterns or match plates.



Industrial Fabricated flasks are normalized and stress relieved before machining to reduce your maintenance cost.



PRESTEEL flasks are made for light and medium duty. Accurate, durable and economical.



Patterns and match plates made from casting resins and laminates are available to you at considerable savings in time and cost.

Ask for catalog material or for one of our representatives to call.

remember that number

INDUSTRIAL AND FOUNDRY SALES INC.

TELEPHONE 2851

EATON RAPIDS, MICH.

(*Concluded from page 222*)

Mass., was co-chairman.

Mr. Wilder discussed briefly the applications, advantages and limitations of various molding methods and melting techniques, covering those furnaces most widely used. He touched upon metallurgical developments in the ferrous and nonferrous metals, and described advancements and implications of automation as well as semi and full mechanization in foundry operations.

In covering the importance of quality control in relation to the reduction of scrap, he cited the necessity for considering effects of the human element in addition to engineering design, metal and molds. The speaker concluded by outlining major developments in all phases of the industry and showing their influence on the operation. He pointed to the need of future research to assure continued industry advancement.

Speaker at the second ferrous session was William J. Sommer, Plainville Casting Co., Plainville, Conn., who spoke on "Quality Control in the Small Foundry." Chairman and co-chairman were Forrest Scott, Narragansett Gray Iron Foundry Co., Providence, R. I., and William Hale, Springfield Foundry Co., Springfield, respectively.

On the thesis that quality control programs need not be limited to large shops, the speaker outlined the organziation and operation of such a program in small and medium foundries. Specific suggestions were made for each foundry department and every phase of the operation. Mr. Sommer's complete paper on the subject was presented in the December, 1952, issue of FOUNDRY.

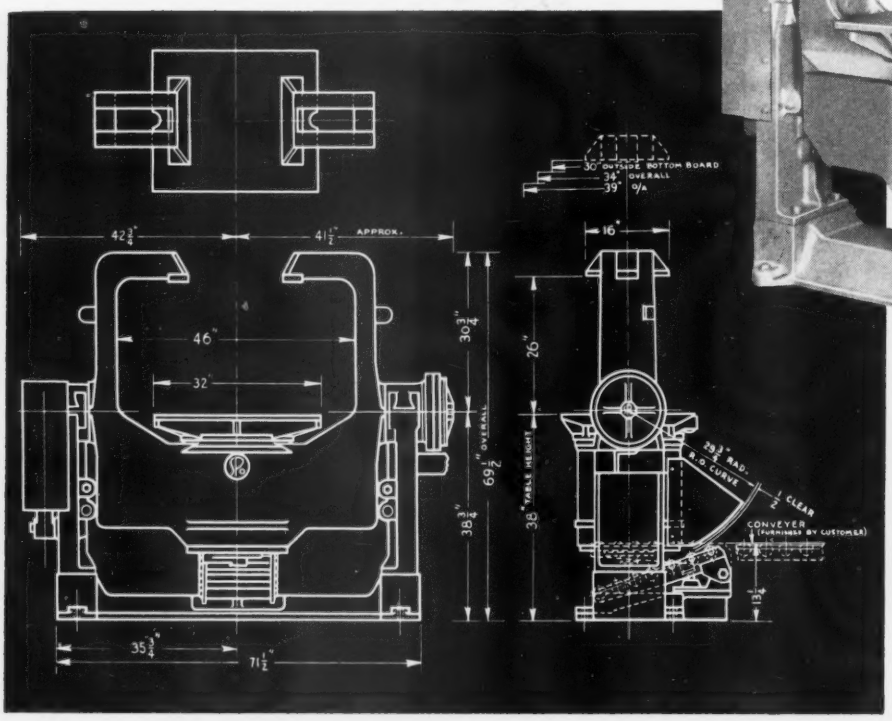
The concluding ferrous session featured a talk on "Getting the Most from Your Cupola" by D. E. Krause, Gray Iron Research Institute, Columbus, O. Joseph B. Stazinski, General Electric Co., Everett, Mass., was chairman with Kenneth B. Hapgood, Hunt-Spiller Mfg. Corp., South Boston, as co-chairman.

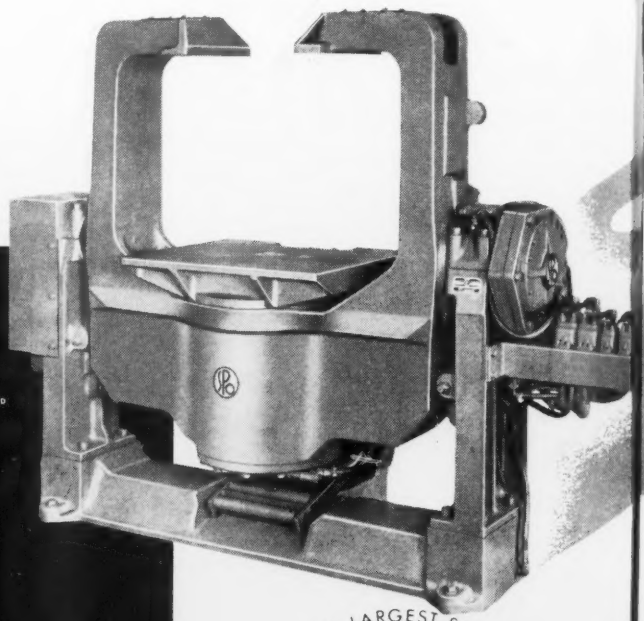
The speaker stated that application of good melting technique, careful weighing of charge components, proper equipment maintenance and use of clean materials in the charge will do almost as much as the installation of much available auxiliary equipment in improving control of cupola iron quality. In fact, unless proper cupola operation methods are practiced, full benefits can not be realized from the various instruments and newer developments such as hot blast, dry blast and slag control which do help to improve operational control.

It is false economy to try to correct off-quality iron at the spout, and Mr. Krause went on to make specific suggestions for proper practice, citing the necessity for keeping melting records and pointing to the usefulness of the inexpensive chill test as a control device.

The foundrymen's smoker, sponsored by local representatives of foundry equipment and supply firms, was held at the Parker House Roc Boston, Saturday evening following the conference. Committee in charge of arrangements included Chairman Ray Hunter, Treasurer Harry Impey, Robert Bonner, H. E. Gibbs, Alex Haigh, Fred Holway, William Naughton, Malcolm Stevens, John V. McCarthy, Richard Tibbetts, Harold Prindle, William Hale, Dan Prendergast, Herbert Klein, Charles Reed C. A. Wyatt, Jack Orrok, Ed Taggart, Larry Beebe, Al Wright, John Dunlop and Harold Ross.

Capable of handling a wide range of flask sizes, Model 9546 has a 1000-lb. jolt and 14,500-lb. squeeze on 80 p.s.i. line pressure. Table size is 26x32" and rollover curve radius is 29¾". Machine stands 69½" high overall.





WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

MAGNESIUM ASSOCIATION MEETS

To Discuss Industry Progress

MEMBERS of the Magnesium Association met in New York, Nov. 2-3, for their ninth annual meeting. Discussion centered on metallurgical developments and new applications for cast and wrought products.

James S. Kirkpatrick, Brooks & Perkins Inc., was re-elected president of the association. New officers are: Vice president, L. G. White, Dominion Magnesium Ltd.; treasurer, J. D. Cosman, Superior Bearing Bronze Co. Martha I. Hansen was re-appointed assistant secretary.

Magnesium has moved into an important position in the die casting industry in recent years, it was stated at a Casting Division session by G. F. Hodgson, Doehler-Jarvis Division, National Lead Co., Toledo, O. Helping boost die-cast magnesium shipments since 1950 were increased prices of secondary aluminum and restrictions on aluminum's use following Korea. Shipments in 1952 soared to 9000 tons, against 1145 tons in 1950.

Mr. Hodgson said that only about 12 of the 622 plants engaged in producing die castings in the United States make magnesium parts, and that six plants accounted for over 80 per cent of the tonnage reported in 1952. "Consumption of magnesium during the period might have been far greater, if more die casting plants had previous experience in casting magnesium," he added. "Since it is practically the same as for aluminum, the casting equipment was available. Conventional cold chamber machines are used almost exclusively for both aluminum and magnesium. Unfortunately for the magnesium industry, however, a real shortage existed in casting experience."

Discussing foundry characteristics of magnesium alloys containing thorium, H. G. Warrington, Dominion Magnesium Ltd., said that these alloys appear to be easier for the foundryman to handle than are the rare earth alloys. Presence of thorium is said to make alloying with zirconium easier and gives higher zirconium recoveries. Properties of the alloys suggest that sand castings can be formed by hot or cold work if necessary and still retain the required mechanical properties, even in a welded assembly composed of such alloys.

While thorium is an expensive alloying element for commercial magnesium castings, Mr. Warrington said that the resulting mechanical properties are so good at ambient and elevated temperatures that the thorium-magnesium alloys can replace aluminum alloys of the same sections, thus obtaining magesium's weight saving.

According to the speaker, early castings made of the thorium containing alloys misran on sections that normally should fill easily. At the same time fluidity tests showed that at the equivalent superheat, the alloys were at least as good as AZ91 alloy. The castings were sectioned and it was seen that the apparent lack of fluidity was caused by clogging of the gates and perforated screens by oxide formation. Such misruns can be avoided by reducing melting, holding and pouring temperatures and by more careful flux covering and refining.

800 drag molds per day

. . . WITH THE SPO MODEL 9546 JOLT-SQUEEZE CLAMP-ROLLOVER-DRAW MACHINE

Engineered for fast . . . safe . . . low-cost production molding, Model 9546 is a "money maker" in any foundry. The SPO design and construction features incorporated in this unit assure continual operation at peak capacity with minimum maintenance cost and down-time.

Features of this SPO molding machine include an adjustable two-speed draw . . . the patented SPO "inverted jolt" mechanism . . . an integrally mounted draw vibrator . . . the SPO valveless jolt control, which is variable from a light tap to a heavy blow . . . and air-operated rollover, brake and roll-out conveyor. For ease and simplicity of operation, the complete molding cycle is controlled by three finger-tip valves.

Model 9546 is furnished complete with necessary operating valves, lubrication fittings and vibrator. It requires only attachment of air supply line to begin economical production of uniform standard drags.

WRITE FOR BULLETIN 9000 FOR COMPLETE DETAILS.

SPO INCORPORATED

6449 GRAND DIVISION AVENUE • CLEVELAND 25, OHIO

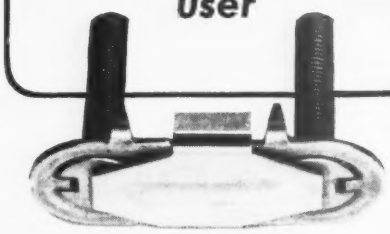
THERE'S A SPO MACHINE FOR EVERY MOLDING JOB

1548-SI

FLEXCO FASTENERS

with ASSEMBLED BOTTOM PLATES

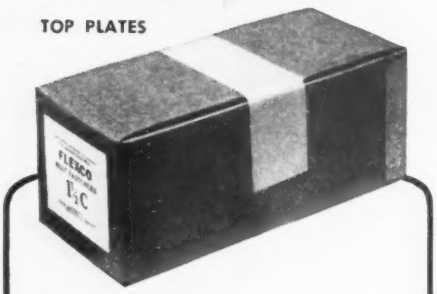
For the large quantity user



ASSEMBLED BOTTOM PLATE

NUTS

TOP PLATES



You can now save assembling time at *no increase in price!*

FLEXCO Conveyor Belt Fasteners with assembled bottom plates, are available in "C" cartons of 100 complete sets each.

Parts are kept separate in the carton.

Made of Steel, Stainless, Monel, Everdur and Promal — order them in "C" cartons.

See Your Supply House

Bulletin F-106 Gives Complete Details

FLEXIBLE STEEL LACING CO.
4667 Lexington Street
Chicago 44, Illinois

Clamer Medal Goes to Robert F. Mehl

The Francis J. Clamer Medal has been awarded to Robert F. Mehl, director of metals research laboratories and professor of metallurgy, Carnegie Institute of Technology, by the Franklin Institute, Philadelphia, for his contributions to the fields of metallography and metallurgy.

A pioneer in the application of gamma ray radiography to the study of welds and castings, Dr. Mehl also was responsible for practical development of the use of radium emanation in place of x-rays for the detection and photographing of internal defects in castings up to 12 in. thick. He was the first person in this country to apply the electron microscope to the study of steel microstructure.

Speakers Directory for Heating Industry

Industrial Furnace Manufacturers Association Inc. has issued a speakers directory listing representatives of the industrial heating industry available for talks. Purpose of the spokesmen is to acquaint users with what is new in the heat-treating field as well as to provide how-to-do-it information on maintenance, safety, etc.

Papers offered by 54 available speakers, some illustrated with slides, cover the whole range of industrial furnaces and ovens and their applications. Copies of the directory are available from the Industrial Furnace Manufacturers Association Inc., 412 Fifth St., N. W., Washington 1, without charge.

Everything Is Relative

In Meriden, Conn., recently, it took two men to push a wheelbarrow filled with 300 pounds of coal up a plank on a steep grade while Charles Saunders, 80, watched. When one of them said to him, "I'll bet you can't get that wheelbarrow up the plank," Saunders replied that he did not bet, but he grasped the handles anyhow and pushed the load up the incline and another 30 feet beyond.

"That was quite a big load you moved," the challenger said.

"Depends on who's moving it," Saunders answered.

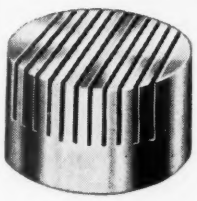
He is a retired foundry worker.

SMILLIE

CORE BOX VENTS

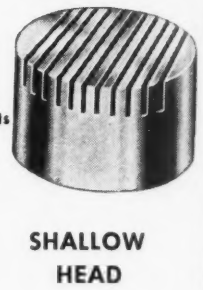
"A Specific Type for Every Core Box"

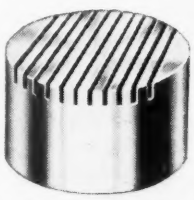
Slotted



X-TRA DEEP HEAD
.156
Wide Slots
.014

DEEP HEAD
.093
Wide or Narrow Slots
.014 .010

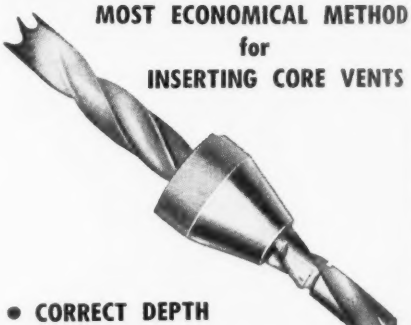




SHALLOW HEAD
.031
Wide or Narrow Slots
.014 .010

INSERTING DRILL

MOST ECONOMICAL METHOD for INSERTING CORE VENTS



- **CORRECT DEPTH**
- **UNIFORMITY OF HOLES**
- **FASTER INSERTION OF VENT**

VENT CLEANER

FOR CLEANING SLOTS
- **MADE OF TEMPERED STEEL**
- **EASY TO USE**

MANUFACTURERS OF PRECISION MACHINED-GROUND PARTS TOOLS - GAGES - FIXTURES

C.M. SMILLIE & CO.
1124 WOODWARD HGTS.. FERNDALE 20. MICH.

Foremen's Problems

(*Continued from page* 119)

friends and influence people, especially foremen.

If this running fight is in existence, bad relations mean loss in efficiency, poor morale, more stoppages and downtime, excessive maintenance costs and higher percentage of seconds and waste.

Lists Maintenance Grievances

Foremen's grievances about maintenance are usually directed at:

1. Lack of preventive maintenance
2. Temporary repairs rather than thorough jobs
3. Chronic behind-schedule of maintenance department
4. Allocation of priorities not in hands of operations
5. Understaffed maintenance crews
6. Paucity of standby equipment
7. Decisions to repair rather than replace machines
8. Substitutions in lieu of specifications
9. Favoritism

Approach: Friction is costly and needless. If it is impossible to find a completely objective executive to survey the situation, consideration should be given to using skilled outside help. Traditional lines of authority and operation sometimes persist in maintenance despite changes in other parts of the plant. Cost fact-finding might help give perspective to a revision of the maintenance department's organization and budget. Understanding each other's problems will smooth relationships. Methods of reporting and allocation of priorities might need review.

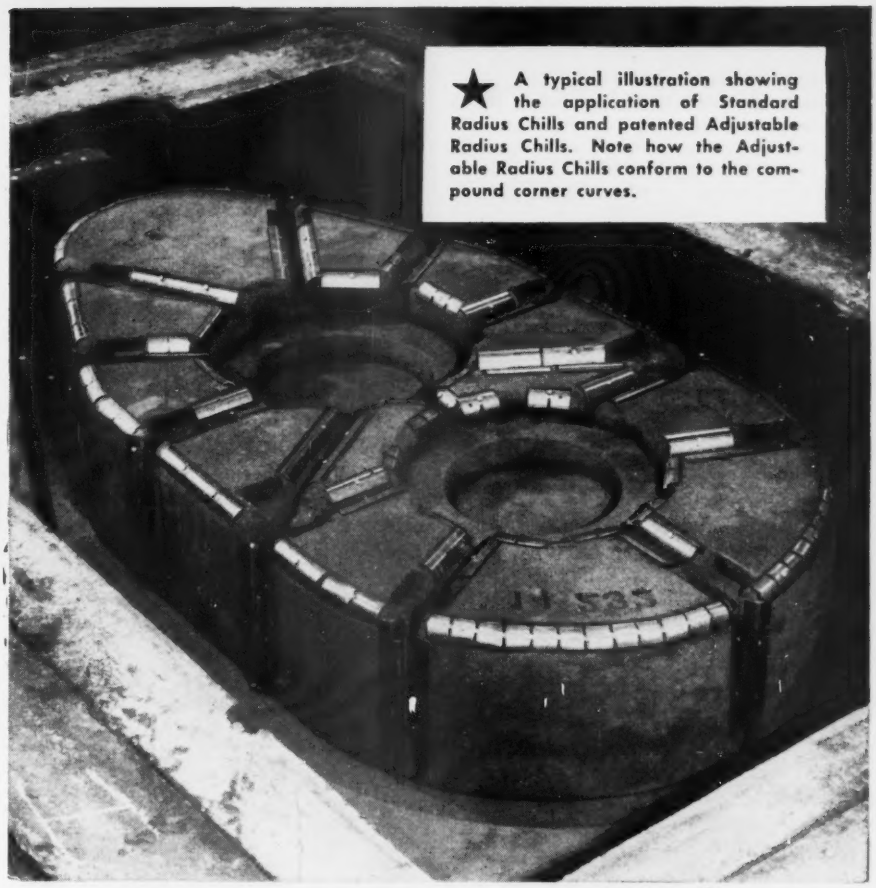
Solution and Prevention: Temporary betterment can be obtained by having group meetings between foremen and maintenance representatives. Blowing off steam, and explanations will help clear the air. Permanent improvement will come if maintenance is geared realistically to the needs of the operations departments. Some method of hearing and acting on foremen's grievances, as well as those from maintenance, should be set up with two-way reporting of results.

Lack of Information; Slowness of It When It Does Come Down—

"It's embarrassing to find out from my men what's going on in the front office. . ."

"They ask me questions, and I feel like a dummy when I have to run to the office for answers.

Approach: If foremen are to function as representatives of management, they must know management's side of every question pertaining to



★ A typical illustration showing the application of Standard Radius Chills and patented Adjustable Radius Chills. Note how the Adjustable Radius Chills conform to the compound corner curves.

ASK FOR

Milwaukee

RADIUS CHILLS

Straight Section or Adjustable

Milwaukee straight section Radius Chills have been used to considerable advantage on straight fillets and edges in many leading steel foundries. The new patented Adjustable Radius Chills, with equally spaced slots so that sections may be cut off in one inch segments, fulfill the need where chills are necessary along the fillets of cylindrical, round, or irregularly shaped castings. These Adjustable Chills have effected substantial savings in welding and cleaning costs.

WRITE FOR SAMPLES AND PRICES

Milwaukee Chaplet & Mfg. Co.

1025 SOUTH 40th STREET • MILWAUKEE 4, WISCONSIN

their duties and their people. Informed foremen are better foremen. Speed is as essential as facts; a combination of both makes the best weapon against rumors.

Solutions and Prevention: An opinion survey will reveal whether or not your foremen are getting information as often, and as fast, as they need it. Some information should be transmitted daily, some weekly, some at longer intervals. Responsibility should be assigned to someone for selection and dissemination of news items; he should see to it that all information flows down the line with greatest dispatch.

The Feeling of Not Being Backed Up—

"I decide to discipline a man, and he knows he can reverse my decision by appealing higher-up. . ."

"After I get everything laid out, the super comes along and turns it all around. . ."

Approach: Cutting the ground out from under a foreman kills his desire to do a good job and spoils his position as leader. However, complaints localized in one or two departments may indicate lack of human-relations techniques, or misunderstandings or lack of information on the part of the foreman.

Solution and Prevention: Fairness to worker and foreman alike must be maintained to keep loyalty of both. Someone not involved directly with foremen relationships with higher echelons should analyze these grievances and discuss them with the parties involved. Adjustments are usually made on a personal basis. A watchful eye should be kept on recurrences of complaints to prevent more serious situations from developing.

Changes, Changes, Changes—

"I get stop orders on jobs where I know and my men know that it costs more to stop than to finish up. . ."

"It beats me. We had changes on one ticket three times in one shift, and we left it right where it was when we started up on it. . ."

"They never tell me why, they just tell me to do it. My people make a joke out of it. 'Hold your hats boys', they yell, 'Here we go again'. . ."

Approach: Someone must judge whether changes are justified, or whether the welter of commands and countercommands are the results of poor organization, planning, research information, hasty judgments, confusion or errant stupidity. Explanations go far in reconciling foremen and their people to what might appear to be senseless deviations from original instructions.

Solution and Prevention: Runback on some orders that have proved troublesome in production, charting the backtracking and detours through the plant. They can reveal the key spots where foul-ups occur, or they may be used to illustrate to personnel of concerned departments what changes mean to cost and waste. Beginning at the top have every order or change include a brief "why." Let members of the engineering department, planning section or research division tell foremen *their* problems.

Non-Cooperative Shifts and Departments—

"The third shift gets the dirty end

of the stick, and there's no brass around to straighten it out. . ."

"We've got to get the stuff if we want to keep operating. They're supposed to bring it to us, but they never do. . ."

Approach: Minor bottlenecks should be cleared for greatest efficiency of operation. The faults may lie in methods, but they frequently lie in personalities.

Solution and Prevention: A troubleshooter sensitive both to possible personal differences as well as problems of materials handling and methods can save the company time and money. Personality problems can most often be ironed out with the aid of supervision immediately above the foreman level. Chronic gripers may need individual attention.

Housekeeping Chores too Great—

"I sneak back in here on Saturday afternoons and clean up like a porter. . ."

"How can I get production if I pull men off the job to clean up?"

"We've been overcrowded for years. No place to put stuff. Yet, they're always on my tail about housekeeping. . ."

Approach: Good housekeeping is desirable and necessary, but is it creating problems that interfere with production, or adding pressure to foremen's problems? Has the company done all it could to make housekeeping easy in supplying racks, bins, storage space, easy-to-clean surfaces, etc.?

Solution and Prevention: Several companies have increased their custodial services and feel that it has been a step in the right direction. An analysis is necessary before action is taken, especially an analysis of how hard foremen are ridden by those in charge of housekeeping. Foremen usually have practical ideas of how the situation can be improved and their views should form the basis for improvement.

Personal Grievances of Foremen:

By-Passing the Foreman—

"The shop steward seems to be the big gun in this department. The super handles everything and I don't know what happens afterward either . . ."

"Engineers and time-study men go by me like I don't exist, and can they screw up my production. . ."

"They (company officials with visitors) come through here a dozen times a week. Sometimes they act like detectives hunting for a criminal, get my people all nervous. Sometimes they kid around with the girls until they get the whole line balled up. I don't think they say 'hello' to me once out of ten times, and they almost never tell me what they'd like to see, or why. . ."

Approach: The foreman's natural concern about everything in his department and his pride in it are things to be preserved. Normal courtesy should be observed as a matter of course.

Solution and Prevention: Since offenders are usually limited to higher-ups, pointed remarks at staff meetings may suffice. Department heads should instruct their personnel on the reasons why proper procedures should be maintained. Such instruction should be part of indoctrination courses of new employees.

Special Privileges Assumed—

"I've got my hands full enforcing our 'No Smoking' rule. You should see the big-shots come in here smoking, or even lighting up after they get into the department. Makes it tough for me. . ."

"A boy got killed in our freight elevator some years ago. Since then no passengers allowed; it means discharge for an operator to carry passengers. Except, you know who? The president and most of the brass. . . they use them all the time. What are you going to do?. . ."

Approach, Solution and Prevention: Same as above, except, who is going to tell the president?

OTTAWA

SILICA SANDS

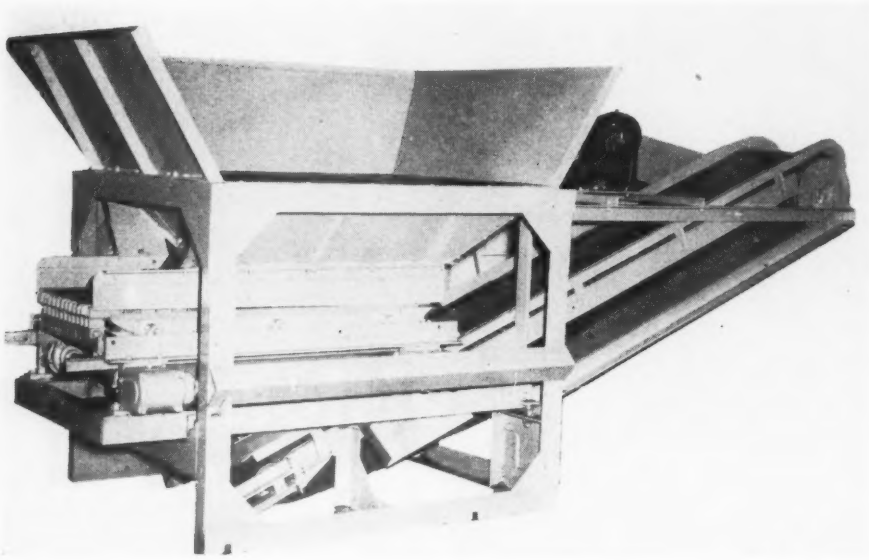
Vision and vigilance make the cat superbly equipped to carry out his nocturnal forays. He symbolizes the qualities that since 1900 have applied to Ottawa Silica Company's tireless attention to product improvement. With the customer in mind, constant research is maintained to provide the foundry industry with the finest silica products in the world. Whatever your sand application, Ottawa Silica Company can supply you promptly with all grades and quantities. For precise, trouble free casting, make your next silica order an Ottawa Silica Company shipment.

Few industrial materials receive the cleansing treatment applied to Ottawa Silica's quartzites. In our three modern mills, they are washed, scrubbed, rinsed, dried, screened and vacuum cleaned. The result is a final product which tests 99.89% pure.

OTTAWA
SILICA COMPANY
PLANTS LOCATED AT
OTTAWA, ILL. AND ROCKWOOD, MICH.

SERVING THE FOUNDRY, GLASS, CERAMIC AND CHEMICAL INDUSTRIES FOR OVER 50 YEARS

New EQUIPMENT a



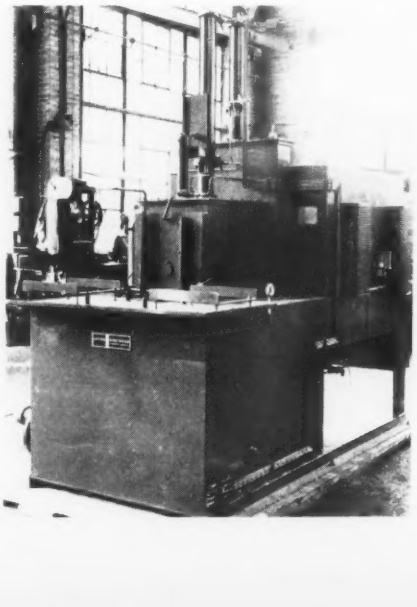
Sand Cleaner: Royer Foundry & Machine Co., 159 Pringle St., Kingston, Pa.—Stationary sand cleaning unit for cleaning molding sand and feeding it into bucket loader of a muller has a capacity of 60 tons per hour. Known as the Royer Scrap Control, it and all related machines can be kept above floor level, eliminating the necessity of costly pits, yet the receiving hopper is only 52 in. above floor level. Consequently it is easily accessible to any of the mobile front end loaders now in foundry use. Welded box frame of the machine houses a shakeout grid and a magnetic discharge conveyor. Unit can shake out small castings in batch procedures, but a variation of this model, which can handle castings in a continuous manner, is recommended where it is practical to leave castings in the sand and transport them with sand in a front end loader. The machine also can be operated in conjunction with the company's stationary sand separator and blender, model NRS, making a complete sand conditioning package unit for any operation which does not require a muller. All models are available with or without magnetic pulley.

For More Details Circle No. 1—Page 233

Paper Wiper: Scott Paper Co., Chester, Pa.—Industrial paper wiper is packaged 125 to a box, 18 boxes to a case. Each wiper consists of two sheets which are joined together for extra durability to provide thorough cleaning and maximum dirt retention. Chemical treatment also creates wet strength. Since it is disposable, it avoids damage to equipment or harm to workers from retained metal or other foreign material. Protection from dermatitis also is increased.

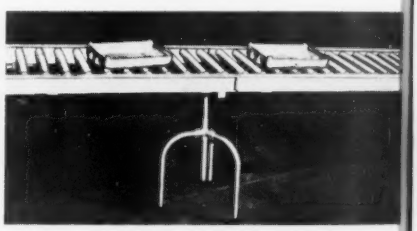
For More Details Circle No. 2—Page 233

Heat Treating: Leeds & Northrup Co., 4908 Stenton Ave., Philadelphia 44—Forced convection horizontal furnace provides automatic control of temperature and atmosphere throughout both heating and quenching cycles. Unit combines heating chamber, quenching tank and protective-atmosphere vestibule so that load is said to be under precisely regulated conditions and never exposed to air from the time it enters the furnace until it leaves the quench. An atmosphere control directly measures and regulates the carbon content of the atmosphere surrounding the work during the heat treating cycle. The equipment can be used between temperatures of 1500 to 1750°F and throughout a range of 0.15 to 1.15 per cent C for hardening, carburizing, homogeneous carburizing or carbon restoration.



For More Details Circle No. 3—Page 233

Conveyor System: Magline Inc., Pinconning, Mich. — All-magnesium, portable roller conveyor system combines strength and utility with lightness and ease of handling. Designed primarily for use where portability and conveyor job-spotting are major considerations, it reportedly can be set up, dismantled and relocated quickly. Of standardized construction, such conveyors can be installed as a complete system or supplied in individual sections, with couplers to match existing equipment. Portable magnesium stands in three height ranges, from 17 to 72 in. above floor level, also are offered.



For More Details Circle No. 4—Page 233

Conveyor Chain: Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4—Drop forged, 2½-in. pitch conveyor chain is reported to have an ultimate strength of 37,500 lb. Flexible in four directions, it employs no riveted pins and can be assembled or disassembled without tools. Both links and pins are made of hard, smooth, forged steel and can be cleaned easily.

For More Details Circle No. 5—Page 233

Snow Plow Blade: Prime-Mover Co., Muscatine, Iowa—Designed as an attachment for model 15 Prime-Mover, improved blade unit for snow removal features a spring type counterbalance for effortless raising and lowering of the snow blade. While blade unit is in use, the vehicle can be equipped with either 10-cu ft hopper

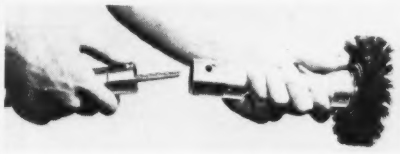
SUPPLIES

For More Details on these Items Use Reply Card—Page 233

or with flatbed to carry ballast for added traction or for hauling sand, salt or cinders for sprinkling on icy surfaces. Blade measures 50 in. wide and can be set at an angle to either side.

For More Details Circle No. 6—Page 233

Quick Change Handpiece: Franklin Balmar Corp., N. A. Strand Division, Woodberry, Baltimore 11—Quick change handpiece is said to



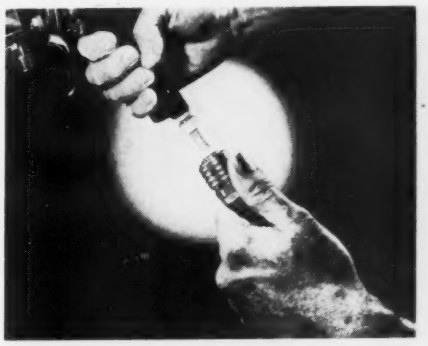
eliminate the need for tools of any sort in changing the working attachment affixed to the end of the flexible shaft. Fitted with a spring-lock retaining button, the device cuts time required for changing tools to only a few seconds. The operator presses the button, pulls the entire handpiece and the permanently affixed tool from the shaft and snaps a new handpiece and tool in place. Users should be equipped with one handpiece for each of the most commonly used tools. The new unit will be standard equipment on all the firm's machines presently equipped with No. 6 handpieces or smaller.

For More Details Circle No. 7—Page 233

Spectrographs: Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.—Two models of 1.5 meter stigmatic grating spectrographs provide different dispersions, resolving powers and plate coverages. Designed for small firms, they are said to produce high-quality spectral lines in analyses of a wide range of nonferrous materials and of complex spectrums of unalloyed gray irons, plain carbon steels and low grade ores. Instrument weighs 150 lb and measures 12 in. high, 18 in. wide and 60 in. long. In both models, the optical system consists of a concave 40 x 80-mm grating, slit, quartz cylindrical lens and film. The combination of cylindrical lens and concave grating provides a stigmatic spectrogram and permits the use of accessory equipment at the slit. One model gives a spectrum coverage of 2250-6250A in the first order, dispersion of 16A/mm, and actual resolving power of 32,000. The other provides a spectrum coverage of 3700-7400A in the first order and 1850-3700A in the second order. Dispersion is 15A/mm in the first order and 7.5A/mm in the second. Resolving power actually obtained in practice is 70,000 in the second order.

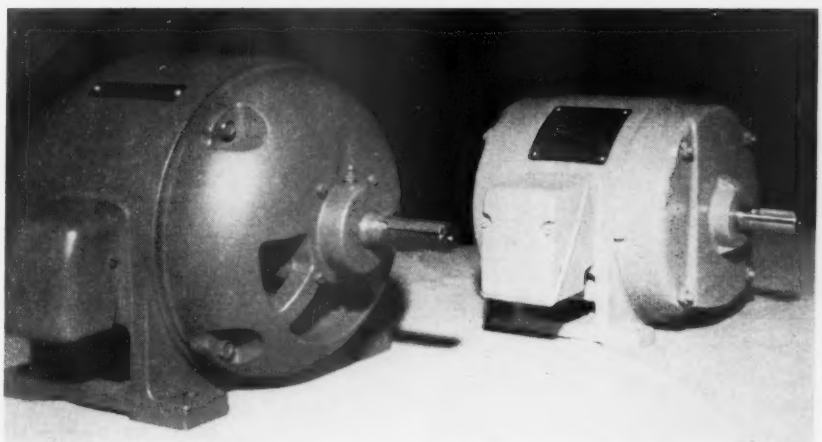
For More Details Circle No. 8—Page 233

Detachable Air Connection: Binks Mfg. Co., 3122 Carroll Ave., Chicago 12—Manufacturer claims that detachable air connection cuts pressure drop at the connection to only 5 per cent. The device has full 360-degree swivel action which does away with need to twist the air hose.



Operator cannot strip or cross thread connections while attaching the air hose. The connection assertedly clicks tightly into place with one short push, air tool and air line becoming a leaktight unit. The de-

New Motors Feature Reduced Size and Weight



NEW line of polyphase alternating current motors is reported to increase protection, efficiency and quietness of operation. On the average, size has been reduced 50 per cent by volume, as illustrated in the view above, and weight is 22 per cent less per horsepower. Rigid cast iron construction has been retained, but insulation system, bearing assembly and ventilation plan are new.

Protection has been increased 60 per cent on the drip-proof enclosure through new end-shield and frame design. Over-all sound levels have been reduced, and motor sound has been altered to a frequency more pleasing to the human ear than the former one. Noise level of the new 10-hp motor is claimed to test as low as that of the former 2-hp model.

Other features include a new, strong polyester film in the insulation system; a long lasting lubricating grease; permanently numbered, nonwicking connection leads; a larger, diagonally split conduit box; knockoff lugs on the end shields; and location of the combination nameplate-connection diagram directly over the box. Full-load speed rating and efficiency have been increased. Manufacturer is General Electric Co., Schenectady 5, N. Y.

For More Details Circle No. 9—Page 233

Electro
TRADE MARK
SINCE 1919

SPECIFIC PURPOSE

Resin • Vitrified
GRINDING WHEELS

Competently specified for your job by our technical experts, Electro Specific-Purpose Grinding Wheels pre-prove their superior worth at your job-side in test runs.

May we send a representative to your job-side to see if we can help better your grinding operation? No obligation.

Electro Refractories & Abrasives Corporation, 344 Delaware Avenue, Buffalo 2, New York
Manufacturing Plants: Buffalo • Electric Furnace Division Cap-de-La-Madeleine, P.Q., Canada • Regional Warehouse Los Angeles 58, California • Grant S. Diamond, President.

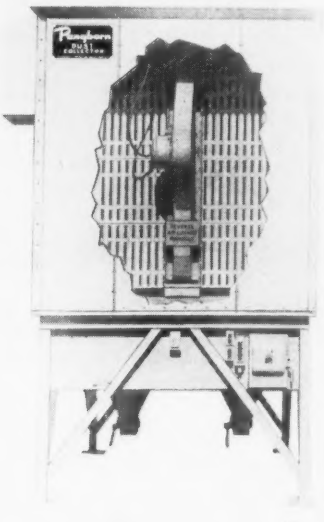
R-441

"ELECTRO"

vice has only two elements, a male member that threads onto the air inlet of the tool and a female member that attaches to the air hose and consists of a sleeve with a sliding collar. A slight downward pull on the sliding collar breaks the connection.

For More Details Circle No. 10—Page 233

Dust Collector: Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Md.—Self-cleaning, cloth screen dust collector is said to permit continuous, automatic dust collection; constant air volume and suction, and positive

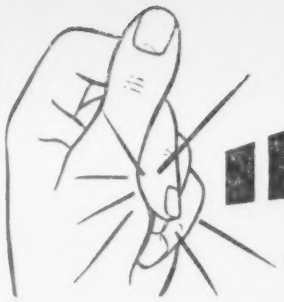


reverse flow filter cleaning. The reverse air flow continuously cleans cloth filters by action of a traveling manifold with integral reverse air blowers which take air directly from the clean air side of the collector. Manifold covers three vertical rows of cloth-covered screen frames at one time and blows reverse flow of air through the center row of screens while a flexible diaphragm on the manifold blocks off normal air flow through the other rows. This mechanical arrangement causes the dust to be blown from all external surfaces of the filter elements and allows it to drop into the hopper, instead of being re-entrained. Standard sizes of the unit are furnished with six-screen-high construction, and four and five-screen-high by 5 ft long screen sections also are available. Existing installations of the company's CH cloth screen collectors can be converted to the self-cleaning type.

For More Details Circle No. 11—Page 233

Hydraulic Fluid: E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia 33—Noninflammable hydraulic fluid is said to be a safe, nontoxic noncorrosive liquid that can be used in hydraulic equipment operated near

(*Continued on page* 235)



IDEAS FOR FOUNDRYMEN

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

71. Rare Earths & Melting

Molybdenum Corp. of America—Progress Report No. 1 on "Rare Earths in Iron and Steel Melting" brings the reader up to date on experimentation in the ferrous field. The 8-page illustrated bulletin presents technical data on their use in wrought steel, cast iron and cast steel and relates the results obtained. Photomicrographs show effect of the additions.

72. Molding Sand Conditioner

Masonite Corp., Chemical Div.—6-page technical bulletin CD No. 16 contains information on Mascon, a low cost replacement for cereal in molding sands. Improvements noted from its use, applications and methods of use are covered. Possible theory of Mascon action is also detailed.

73. Cable Conveyor Systems

Cable-Link Corp.—How Cable-Link cable conveyor systems operate, construction features and application information are found in 6-page illustrated bulletin. Systems are available in heavy duty or lightweight types and are flexible in design. Bulletin has all the details.

74. Specifications Handbook

North American Smelting Co. — Fifth edition of the "Specification Handbook" presents an up-to-date compilation of various specifications issued by Government agencies and metallurgical societies on all standard brass, bronze and aluminum, foundry alloys and fabricated shapes. Fundamental metallurgical and foundry data, plus collection of practical tables are included.

75. Oil & Gas Burners

Hauck Mfg. Co.—28-page catalog 1043C is a foundryman's easy-to-use guide in the selection of oil or gas burners, torches or heaters, including many new units. Fast in heating and easy to use, equipment helps in ladle heating, mold drying, cupola lighting, preheating electric furnace linings, core baking, firing, melting and annealing furnaces, drying coal and sand and welding preheating.

76. Tractor Shovels

Allis-Chalmers Mfg. Co., Tractor Div.—Specifications for 1 to 4-cu yd capacity tractor shovels are briefly presented in folder MS645 which also illustrates many possible applications. Dumping heights range from 9 ft, ½-in. to 13 ft. How to change from shovel to dozer is shown as well.

77. Conveying Equipment

Richards-Wilcox Mfg. Co.—Zig-Zag continuous power overhead conveyor systems are subject of descriptive 4-page folder. System components as well as some installations are shown. Back page features drawings of standard curves and formulas for determining amount of straight track between reverse curves.

78. Organic Core Binder

Delta Oil Products Co.—Detailed description of Delta Bondite, a new organic binder for skin dry, dry sand and green sand molds and cores, is provided in 4-page folder. Its ten most important advantages are listed.

79. Pneumatic Bulk Conveyor

Crane Co.—How the Turbo-Drive pneumatic pipe line conveying system for transporting sand and other bulk materials functions, its advantages and components are covered in 4-page folder AD-1906. Three capacities of 7, 15 and 30 cu ft will transport about 500, 1000 and 2000 lb of sand per minute on a 1-minute cycle. Accompanying folder tells how Ford moves a ton of core sand 400 ft in 70 seconds with the system at its Cleveland foundry.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Helpful Literature" in this issue—simply circle corresponding item numbers on one of these cards

FOUNDRY 12-53
Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME TITLE
COMPANY
PRODUCTS MANUFACTURED
ADDRESS
CITY AND STATE

This card MUST be completely filled out. Please TYPE or PRINT.

1	16	31	46	61	76	91	106	121	136
2	17	32	47	62	77	92	107	122	137
3	18	33	48	63	78	93	108	123	138
4	19	34	49	64	79	94	109	124	139
5	20	35	50	65	80	95	110	125	140
6	21	36	51	66	81	96	111	126	141
7	22	37	52	67	82	97	112	127	142
8	23	38	53	68	83	98	113	128	143
9	24	39	54	69	84	99	114	129	144
10	25	40	55	70	85	100	115	130	145
11	26	41	56	71	86	101	116	131	146
12	27	42	57	72	87	102	117	132	147
13	28	43	58	73	88	103	118	133	148
14	29	44	59	74	89	104	119	134	149
15	30	45	60	75	90	105	120	135	150

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers' Service Dept.

80. Electric Arc Welding

Harnischfeger Corp.—68-page illustrated manual "Working Principles of Electric Arc Welding" provides the operator with technical and practical information and the engineer with basic principles and data on advantages of the process. Besides general information, the primer contains ten welding exercises on various types of welding procedures.

81. Phenolic Casting Resins

Marblette Corp.—Serving as an operating manual as well as a book of facts on phenolic casting resins, this 78-page plastic bound and illustrated volume contains much basic information. Subjects include types and applications of resins, selection and preparation of the mold, machining, finishing and fabricating. Illustrations and sketches are liberally used.

82. Core Extruders

Wadsworth Equipment Co.—Hand and power driven core making machines, core cutting-off and coning machine, drying trays and core plates and gagers are described and illustrated in 12-page bulletin. Specifications of all machine models and time saving features are detailed.

83. Malleable Iron Annealing

General Electric Co.—Description of the cycle for annealing of malleable iron, principle ways to shorten annealing cycles and why G-E electric furnaces shorten cycles and reduce over-all annealing costs are subject matter of 12-page illustrated bulletin GEA-5797. Various types of protective atmosphere equipment are described.

84. Refractory Ramming

International Minerals & Chemical Corp., Eastern Clay Products Dept.—Bondact process for fast mechanical ramming of refractory linings and patches is detailed in 8-page illustrated brochure. Principles of ganister clay refractories, operation of the application machine and benefits derived from its use are covered.

85. Material Handling Boxes

Union Metal Mfg. Co.—Applications and operation of the Work-O-Matic "Big 4" line of multiduty boxes, positioning stands, gravity fed hoppers, multiduty trays and end loading scoops. Application photos are shown. Specifications of each unit are given.

86. Foundry Ovens

Michigan Oven Co.—Advantages engineered into Moco ovens are listed in 4-page bulletin 1152, along with photos of typical installations. Types include roller drawer, car or rack and conveyor core ovens, all featuring horizontal air circulation.

87. Gas & Air Valves

Techno Co.—Technocheck valve for gas and air, which can be used as a nonreturn, antisurge or check valve in any service requiring quick opening or closing, is covered in 2-page illustrated bulletin. It closes lines quickly and automatically on low pressure differential.

88. Sand Additive

United States Graphite Co.—Sand Mex, a compound which increases flowability and heat resistance of foundry sand, is subject of illustrated engineering bulletin No. 16. Instructions are given on use with facing, moving system and core sands, small hand-cut heaps and large machine-cut heaps.

IMPORTANT READING FOR FOUNDRYMEN
We have a limited quantity of the following reprints which we can furnish while they last.

89. Foundry Industry Progress

"A Special Report on Foundry Industry Progress. . ." is title of available reprint taken from FOUNDRY's May, 1953 Pre-Convention issue. In this report representative industry leaders discuss such timely questions as, what are the technical and operating advances of the dynamic foundry industry in recent years. . . what is the present-day status of the industry. . . and what about its future? Articles are "Progress in Castings," "Gray Iron Castings," "Aluminum Castings," 'Steel Castings," "Brass & Bronze Castings," "Malleable Iron Castings" and "Magnesium Castings."

90. Coke in the Cupola

C. R. Austin of Meehanite Metal Corp., in FOUNDRY reprint "Coke Quality and Carbon Pickup" describes tests intended to evaluate behavior of coke in the cupola. Its carburization power or the facility with which carbon passes into solution in molten iron is particularly considered.

91. Principles of Risering

An understanding of the fundamentals of metal solidification and riser application can be obtained from FOUNDRY reprint "The Principles of Risering" by C. F. Walton, assistant professor of foundry practice at Case Institute of Technology. Article is written to help foundry men utilize their experience and allow them to do a more rapid and satisfactory job of rigging work for production than they could otherwise.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers' Service Dept.

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

1	16	31	46	61	76	91	106	121	136
2	17	32	47	62	77	92	107	122	137
3	18	33	48	63	78	93	108	123	138
4	19	34	49	64	79	94	109	124	139
5	20	35	50	65	80	95	110	125	140
6	21	36	51	66	81	96	111	126	141
7	22	37	52	67	82	97	112	127	142
8	23	38	53	68	83	98	113	128	143
9	24	39	54	69	84	99	114	129	144
10	25	40	55	70	85	100	115	130	145
11	26	41	56	71	86	101	116	131	146
12	27	42	57	72	87	102	117	132	147
13	28	43	58	73	88	103	118	133	148
14	29	44	59	74	89	104	119	134	149
15	30	45	60	75	90	105	120	135	150

FOUNDRY
Penton Building, Cleveland 13, Ohio

12-53

Please send literature or detailed information on subjects circled at left to—

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY AND STATE

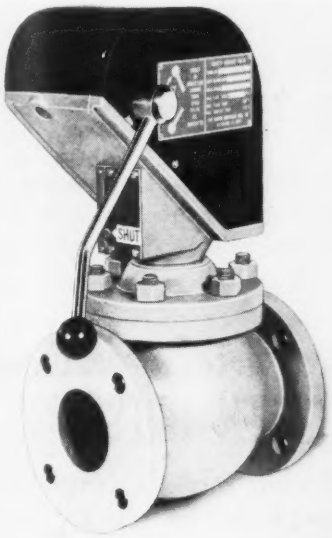
This card MUST be completely filled out. Please TYPE or PRINT

(*Continued from page* 232)

open flames or adjacent to extreme heat conditions. Rated as an "acceptable hydraulic fluid from the fire hazard standpoint" by the Factory Mutual Engineering Division of Associated Mutual Fire Insurance Companies, it is a water-base, snuffer-type material. Said to show the lubricating ability of high grade petroleum hydraulic oils, it will not freeze and is easily pumpable at working temperatures down to 0°F. The fluid will not attack synthetic rubber packings.

For More Details Circle No. 12—Page 233

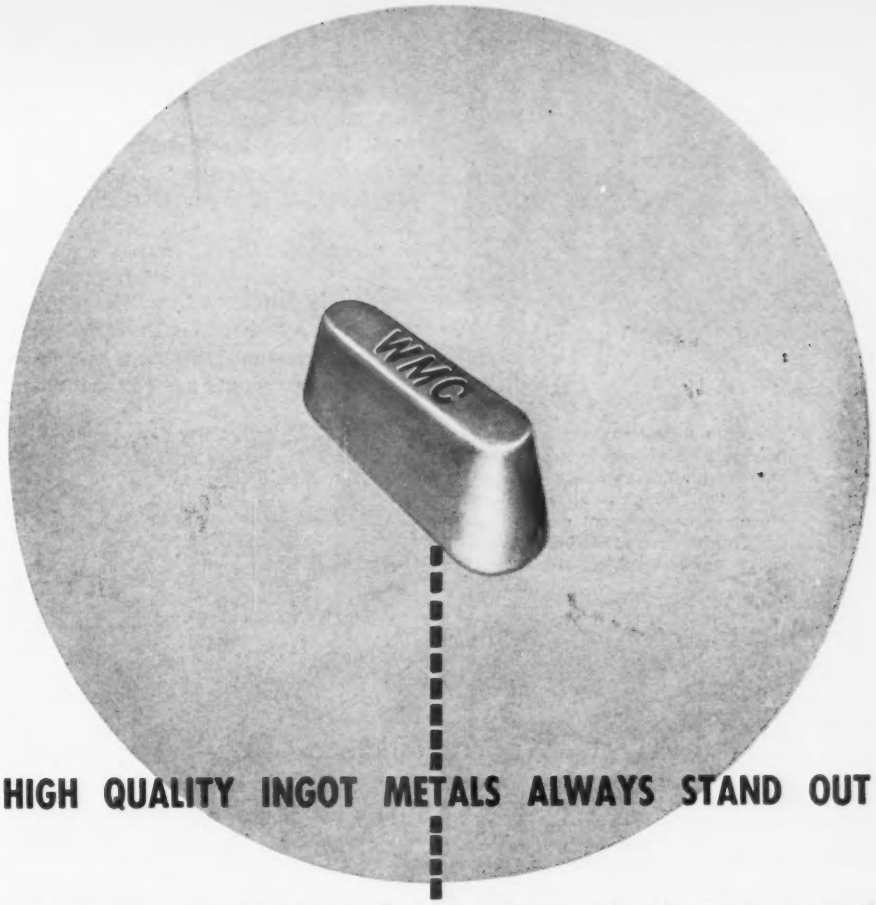
Shutoff Valve: North American Mfg. Co., 4455 East 71st St., Cleveland 5—Globe type, solenoid



operated safety shutoff valve intended primarily for use in gas or oil lines is offered in all standard pipe sizes from ¾ through 6 in. Valves up to 2-in. size have threaded connections; larger valves are flanged, but companion flanges are offered if threaded connections are desired in the large sizes. Mountable vertically, horizontally or overhead, out of reach and operated with a chain and reset wheel, the valve extends 3⅞ in. on one side of the pipe and 4⅜ or 5⅛ on the other, depending on valve size. The mechanism will withstand ambient temperatures as high as 167°F, and oil heated to 250°F may be passed through the valve itself. When valve shuts itself because of flame or power failure, the hand lever becomes disengaged from the mechanism so that the valve cannot be reopened until the cause of its closing is removed.

For More Details Circle No. 13—Page 233

Fire Retardant Paint: Fyr-Kote Co., Division of Morris Paint & Varnish Co., 27th & Douglas Sts., Omaha, Nebr.—Fire-retardant paint is applied to interior walls and ceiling



HIGH QUALITY INGOT METALS ALWAYS STAND OUT

BECAUSE PERFORMANCE ALWAYS SPEAKS FOR ITSELF

ALUMINUM, BRASS, BRONZE INGOTS

An ingot is not very large in comparison with the bulk of the melt, but the quality of the ingot determines the quality of the melt. Here at WESTERN we devote much attention to quality metals, because after all that is what we have to sell: quality and service. We produce the following quality ingot metals: BRASS • BRONZE • ALUMINUM • NICKEL • SILVER • DAIRY METAL • ALUMINUM BRONZE • SILICON BRONZE • SPECIAL ALLOYS. If you're in a hurry, we provide special delivery service on complete stocks of standard BRASS, BRONZE and ALUMINUM ALLOYS. Moreover, you may avail yourself of our complete laboratory service as well as experienced field metallurgists to help you produce the exact quality castings you require.

Western Metal Company

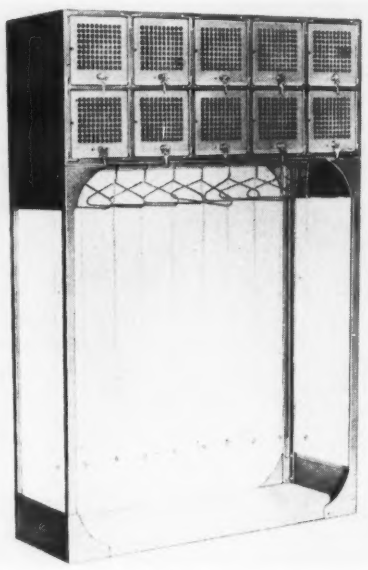
3201 SOUTH KEDZIE AVE. CHICAGO 23, ILLINOIS

SMELTERS & REFINERS OF WMC BRASS & ALUMINUM INGOTS

areas by brush or spray and is said to stop fire from spreading. When exposed to flame, it pours out CO_2 and $CaCl_2$, smothering fire and retarding the spread of flame. The paint is listed by Underwriters Laboratories and carries the Underwriters' label. It is reported to be washable.

For More Details Circle No. 14—Page 233

Locker Rack: Lyon Metal Products Inc., Aurora, Ill.—Portable locker rack accommodates possessions of ten persons. Coats are secured when



chain is dropped through sleeve and locked in position in slot on door, which then is locked. Doors shut from top, and each is equipped with a built-in lock and two keys. A raised base keeps clothing off the floor. Unit is 18 in. deep, 50 in. wide and 76 in. high. Doors are finished in light tan, balance in green, baked-on enamel.

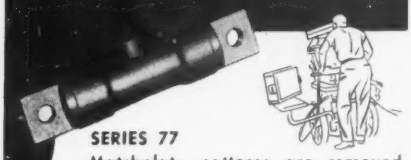
For More Details Circle No. 15—Page 233

Electric Hoists: Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore Inc., Muskegon, Mich.—Line of battery-operated electric hoists has been developed for mounting on trucks to provide lifting wherever the truck happened to be. Designed with 12-v motors and controllers, they can be installed on trucks equipped with a 6-v electrical system by adding another 6-v battery and connecting it according to instructions. Hoists reportedly draw so little current from the battery that normal truck operation keeps battery charged. Units are available in capacities of 1000, 2000 and 4000 lb.

For More Details Circle No. 16—Page 233

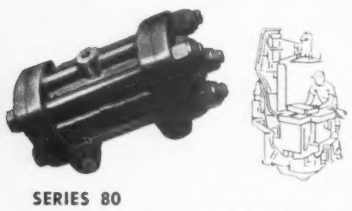
Steel Belt Link: May-Fran Engineering Inc., 1692 Clarkstone Rd., Cleveland 12—Standard component links of the organization's hinged

SPECIFY SPO AIR VIBRATORS

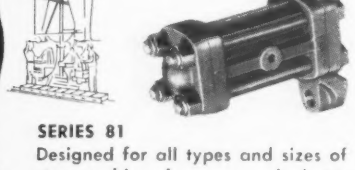


SERIES 77
Matchplate patterns are removed quickly and efficiently from sand molds with this compact, dependable unit. Simple nut and bolt mounting arrangement permits rapid attachment and facilitates interchangeability to other installations.

SERIES 79
A multi-purpose vibrator sturdily constructed for long operation, this powerful unit is recommended for shakeout, hoppers, tables, screens and many diversified types of equipment. Standard and long stroke models available to meet individual requirements.



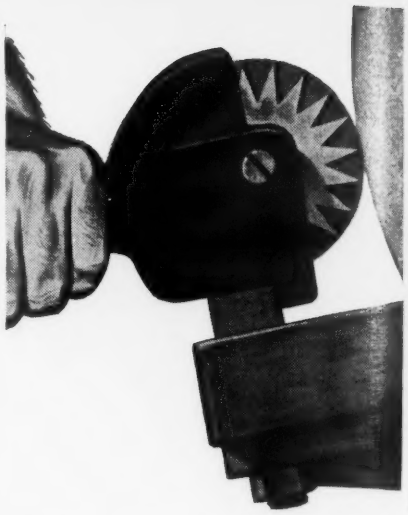
SERIES 80
This powerful heavy-duty vibrator increases production efficiency of molding machines . . . incorporates high-strength cast semi-steel body for long, hard usage.



SERIES 81
Designed for all types and sizes of storage bins, hoppers and chutes handling powdered or granular materials, this unit delivers powerful, hammer-like blows . . . prevents arching-over or plugging . . . assures a steady flow of materials.
1411-SI

Write today for Bulletin 50 for complete details.

SPO INCORPORATED
6449 GRAND DIVISION AVE.
CLEVELAND 25, OHIO



more pieces ground . . .
PER HOUR

Grinding wheels dressed with the right dresser, type and size, enable you to speed up your grinding per hour — save production costs.

more pieces ground . . .
BETWEEN DRESSINGS

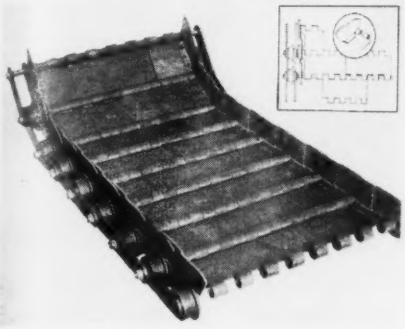
With the correctly designed Desmond dresser for your application, you get more work out between dressings. And it takes only a moment to dress any wheel for proper performance.

more pieces ground . . .
PER WHEEL LIFE

You'll get maximum service from grinding wheels that are dressed with the correct type and size of Desmond Dresser. Ask your DESMOND DISTRIBUTOR for a copy of the Desmond Dresser Guide Chart. This guide and the technical information the Industrial Distributor furnishes you will improve the efficiency of your grinding operation.

THE DESMOND-STEPHAN MFG. CO.
URBANA, OHIO
Desmond
DRESSERS & CUTTERS

steel belt have been redesigned to incorporate four interlocking flanges on each side of the link, providing



greater distribution of stress on the belt and allowing links to be staggered. Lateral movement between individual links is eliminated, and falling through of material is minimized, according to the manufacturer. In addition, increased precision in the positioning of links provides a slightly increased carrying capacity. All links can be furnished solid or with perforations which permit the drainage of coolants and other solutions. Links are made from heavy gage steel plate and fastened with high-carbon steel rods. Side chains are an integral part of the conveyor belting. The mass-produced, stocked component parts can be assembled to form belting of from 6 in. to almost any required width and length.

For More Details Circle No. 17—Page 233

Safety Hooks: Safety Hook Division, E. D. Bullard Co., 275 Eighth St., San Francisco 3—Safety hook includes a rustproof safety gate which locks automatically and will not open unless the pin is manually depressed. Gate is designed to use the hook shank as its operating base, yet does not obstruct the throat of

the hook. It can be adapted to fit all makes and sizes of standard hooks and opens and closes easily in all kinds of weather. Since it swings open horizontally on the shank axle, even a full hookload will not snag in loading or unloading operations. Hooks are drop-forged steel with

CESCO RIGHT... before your Eyes!

NEW

Approved by Bureau of Mines

Organic Vapor Respirator No. 99

• Here's a brand new twin cartridge respirator that fits perfectly. The facepiece is contoured to provide snug, comfortable, leakproof fit without excessive tension of the adjustable dual headbands.

• Positive acting inhale-exhale check valves prevent rebreathing or exhausting through cartridges. Valves are replaced without tools. Two 85cc absorbent cartridges provide ample breathing efficiency. They are easily and quickly replaced by unscrewing retaining caps.

• The CESCO No. 99 Respirator is covered by Bureau of Mines approval No. 2307 for organic vapors not exceeding 1/10 of 1% by volume.

Converts to Dust Respirator No. 96

• By simply replacing the vapor cartridges with CESCO filter pads, the No. 99 Respirator is converted to the No. 96 CESCO Dust Respirator. Filters are treated wool-felt with no outside screens or covers. The entire frontal surface of the filter is usable providing maximum efficiency and little resistance to breathing.

• The No. 96 Respirator is covered by Bureau of Mines approval No. 2167 for all dusts not significantly more toxic than lead.

Dual Purpose Saves You Money

• The unique feature of quick conversion from organic vapor to dust respirator by merely changing the two cartridges or filter pads makes these highly efficient CESCO No. 99 and No. 96 approved Respirators very economical. You buy only one respirator and elements as desired. They save you money.

Send TODAY

for CESCO literature and the name of your CESCO safety equipment distributor

CHICAGO EYE SHIELD COMPANY • 2324 Warren Blvd. • Chicago 12, Ill.

CESCO FOR SAFETY

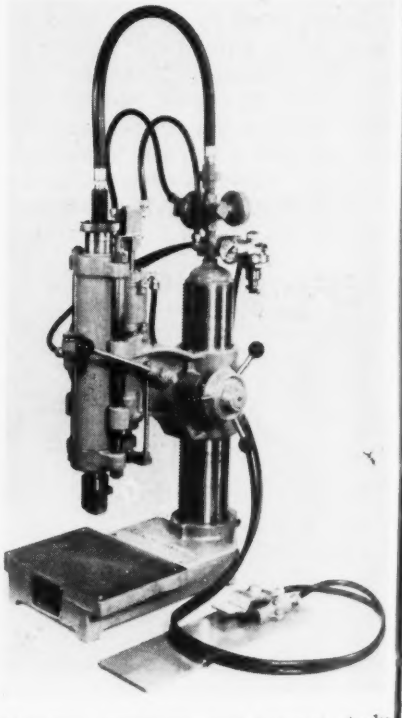
OFFICES IN: Atlanta, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Detroit, East Orange, Houston, Kansas City, Knoxville, Little Rock, Los Angeles, Mexico City, D. F., Milwaukee, Montreal, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Spokane, St. Louis, St. Paul, Toledo, Tulsa

cadmium plated component parts. Gates are of brass and are available with or without return spring for automatic closing. Hooks are available in sizes 2 to 16 A, and greater weight capacities may be ordered specially.
For More Details Circle No. 18—Page 233

Sweeper: G. H. Tennant Co., 2566 North Second St., Minneapolis 11—Industrial power sweeper reportedly enables one man to tilt and dump a fully loaded 9-cu-ft hopper holding up to 700 lb of dirt. Operation requires 30 seconds with a few turns of a ratchet type lever. The machine sweeps a 36-in. path at speeds up to 6 mph and is said to sweep over 100,000 sq ft per hour in open areas. A rotary, 21-in. side brush increases path width to 48 in. and allows sweeping flush with wall, curbs, fences and under guard rails. Almost dustfree, the unit incorporates an 11-in. vacuum fan that sucks dirt into a large fabric bag. Designed for easy handling in congested areas, the sweeper turns in a 5-ft radius. Clutch is controlled by a single pedal and allows instant

change from forward to reverse. No gears are shifted. Power comes from a 7.3-hp, air-cooled gas engine.
For More Details Circle No. 19—Page 233

Impact Press: Heidrich-Nourse Co., 631 East Third St., Los Angeles 13—All-pneumatic impact press features uniformity of impact force on work pieces that vary considerably in thickness, operator safety and speed up to 10,000 cycles per hour. Operation is on the principle of a variable stroke air hammer on piston-ram which moves within a closed cylinder and strikes a chuck projecting through the bottom of the cylinder. Length of hammer stroke inside the cylinder is adjusted by a large hand nut at the top. Pressing a foot-valve pedal brings the cylinder assembly into contact with the work by a hydraulic traverse mechanism. Traverse and impact stroke are linked in sequence, but each is adjusted independently. On work of uniform thickness, the clearance can be as little as 0.005 in., at which distance the machine still will deliver an impact of any force desired from 30



"500 POUND MELT EVERY 20 MINUTES . . higher quality castings!" with ECLIPSE SPECIAL REVERBERATORY FURNACE

. . . reported by well known shovel manufacturer now using a Special Eclipse Reverberatory Furnace for melting brass. Unusually high production is achieved because Furnace melts faster, requires no waiting between heats. Hot metal is always available . . . returns, gates, and risers are charged with the ingot as the metal is poured. Heat is maintained at all times. Burner is never turned off for tapping or cleaning. Combustion normally wasted is used for melting and preheating cold metal. Near-perfect combustion and controlled uniformity of bath produce higher quality castings . . . reduce rejects due to blow holes and other defects obtained with previous methods. Special Eclipse Reverberatory Furnaces are built to meet your specific needs for melting iron, brass, aluminum. Gas or oil fired . . . bath capacities from 300 to 4400 lbs.

ECLIPSE FUEL ENGINEERING CO., ROCKFORD, ILLINOIS
ECLIPSE FUEL ENGINEERING CO. OF CANADA, LTD. TORONTO, ONT.

CALL YOUR Eclipse ENGINEER

New FREE Catalog — detailed capacities and specifications.

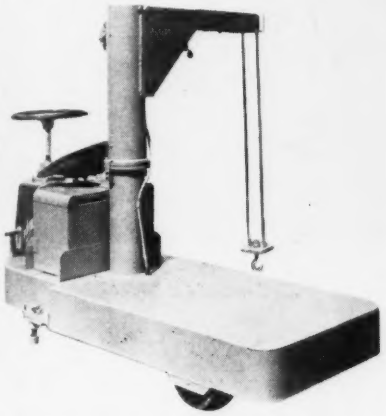
Paste coupon to letterhead or postal card and mail today.

ECLIPSE FUEL ENGINEERING CO.
1125 Buchanan Street, Rockford, Illinois
☐ Please send your free catalog No. C-90.
☐ Have Eclipse Engineer call to discuss my problem.
Firm Name _____
Individual _____
Address _____
City _____ State _____

to 30,000 lb. On work that varies considerably in thickness, the vertical clearance can be set for the thickest piece, and the impact will be uniform on all pieces without further adjustment within the traverse range of 2¼ in.

For More Details Circle No. 20—Page 233

Revolving Crane Truck: Market Forge Co., Everett, Mass.—Revolving crane truck developed originally to remove molds from tire molding machines and to replace them again is reported to be useful in handling molds and other equipment in storage and for miscellaneous work in



maintenance. Truck has capacity of 2000 lb, and over-all height is 68 in. Hook is 60 in. high when raised and 10 in. when lowered. It projects 24 in. over either side of the truck and is raised or lowered by power furnished by a separate double-acting ram hydraulic system inside the main mast. Boom has complete angular travel of more than 180 degrees. Body for the unit is the company's standard freight truck. Entire unit weighs 4800 lb, including battery. Speed is 2½-3 mph loaded, 3-3½ mph unloaded.

For More Details Circle No. 21—Page 233

Conductivity Meter: Magnaflux Corp., 7300 West Lawrence Ave., Chicago 31—Conductivity meter permits rapid measurement and makes the physical property of conductivity a practical and useful industrial tool. It assertedly gives absolute conductivity measurements of nonferrous conducting materials directly from a large dial on its front. Operator places the hand probe on a part, on a relatively flat area about ⅜ in. in diam, and reads the dial. For many applications, the company says, the absolute conductivity reading is all that is needed. It sometimes can be used to sort mixed lots of metals and alloys. The other general category of applications depends upon the relationship between conductivity and other physical properties. It includes

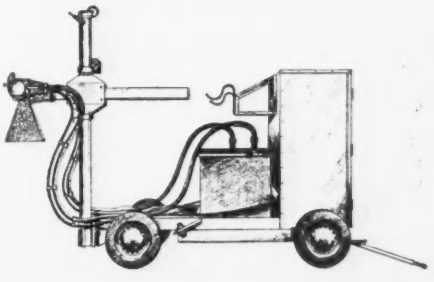
Costly Repair Avoided by Early X-ray Inspection

The Lang Company, Inc., of Salt Lake City, Utah, makers of pressure vessels, uses the Westinghouse 250 KV Mobile X-ray Unit extensively throughout their plant. This mobile unit moves easily to the fabrication site. A complete X-ray inspection is quickly made, and defective welds are replaced at a lower cost than if found after pressure tests.

Throughout the metal-working industry the Westinghouse 250 KV Mobile X-ray Unit handles many equally important money-saving tasks. If internal defects increase your costs, this X-ray unit will help you lower them.

Westinghouse has X-ray sales offices across the nation; they are staffed by experienced men who can help you solve inspection problems, and who can demonstrate savings. Call your nearest X-ray representative or write to the address below.

J-08267

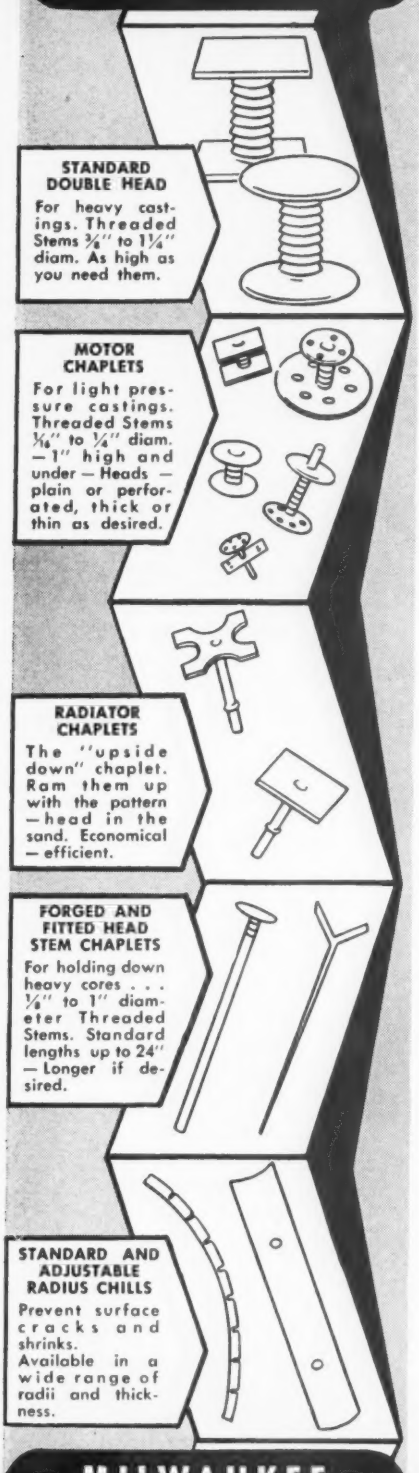


Westinghouse Electric Corporation, X-ray Division, Dept. N-67
2519 Wilkens Avenue, Baltimore 3, Maryland

YOU CAN BE SURE...IF IT'S

Westinghouse

MILWAUKEE
CHAPLET



STANDARD DOUBLE HEAD
For heavy castings. Threaded Stems ¾" to 1¼" diam. As high as you need them.

MOTOR CHAPLETS
For light pressure castings. Threaded Stems ⅛" to ¼" diam. — 1" high and under — Heads — plain or perforated, thick or thin as desired.

RADIATOR CHAPLETS
The "upside down" chaplet. Ram them up with the pattern — head in the sand. Economical — efficient.

FORGED AND FITTED HEAD STEM CHAPLETS
For holding down heavy cores . . . ⅛" to 1" diameter Threaded Stems. Standard lengths up to 24" — Longer if desired.

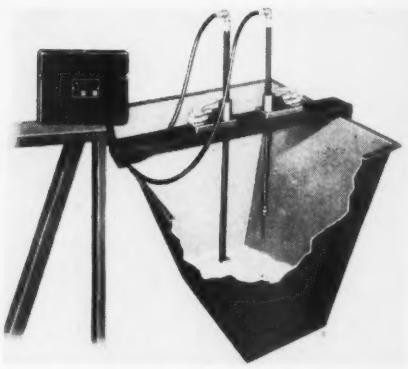
STANDARD AND ADJUSTABLE RADIUS CHILLS
Prevent surface cracks and shrinks. Available in a wide range of radii and thickness.

MILWAUKEE
CHAPLET
AND MFG. CO.
1023 S. 40th STREET
MILWAUKEE 15, WISCONSIN

hardness testing, process and quality control in heat treatment and controlling the purity of melt of nonferrous metals and alloys. The unit is portable.

For More Details Circle No. 22—Page 233

Sand Distribution: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Automatic, positive-level distribution of foundry sand from a



belt to several hoppers or bins is said to be accomplished by a unit that controls air-operated plows according to the amount of sand in the hopper. The design reportedly makes provision for minimum wear on belt, plows and operating parts. Sand level is maintained between two adjustable probes. Electronic units on each hopper are interlocked so that plows can be operated one at a time.

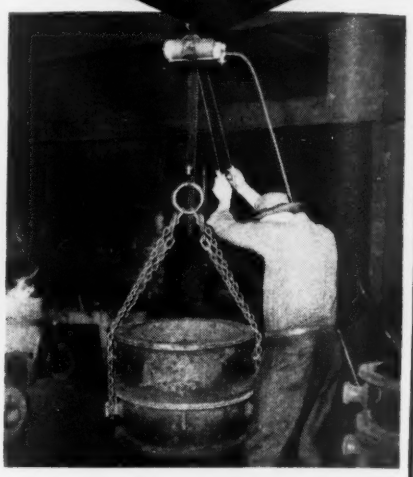
For More Details Circle No. 23—Page 233

Portable Positioner: James Campbell Smith Co., Willoughby, O.—Portable positioner designed for lifting castings, plates, weldments and all heavy machinery and equipment combines wedge, screw and toggle to form a gripping unit. It lifts a load into any position desired and remains clamped on while it goes through any number of operations. Chains, pry bars, ropes, eye bolts, blocking and "C" clamps are not necessary. Self-aligning, heat treated grip has sharp edges that cut through paint, grease, rust, scale and oil. Long shackle allows for 360 degree movement. The positioner is cadmium plated for visibility, cleanliness, rustproofing and long life. Two models have 0 to 2-in. and 1 to 8-in. jaw openings and 2-ton capacity with a 300 per cent safety factor.

For More Details Circle No. 24—Page 233

Industrial Scales: Toledo Scale Co., Telegraph Rd., Toledo 1, O.—Industrial scales ranging from bench models to those for heavy duty trucks feature one-piece sectors in the full floating, double pendulum mechanism. This construction is said to increase

RATED FOR
continuous
duty



Sensationally Different

KELLER
Air Hoist

with positive displacement piston-type air motors

Keller Air Hoists can be used continuously over periods of hours (or days) without danger of shortening motor life.

DUST, FUMES cannot injure an air motor. Nor will it burn out, even if stalled all day long.

LOW MAINTENANCE because of simple design. Only a few working parts, and these are fully enclosed. Two grease fittings lubricate all working parts.

VARIABLE SPEED from 0 to 17 fpm permits safe handling of fragile loads. The load hook can be "inched" up or down for accurate spotting.

LIGHTWEIGHT—A 1,000-lb capacity hoist weighs only 30 lb—easy to carry up or down a ladder, and move from job to job.

SEND FOR DETAILED INFORMATION

KELLER
Pneumatic Tools

KELLER TOOL CO., GRAND HAVEN, MICH

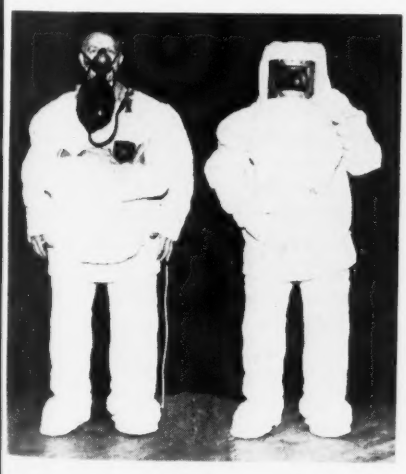
precision and strength and to eliminate the hand adjustments necessary in the older assembly of several components. Indicating heads can be installed to face in one of eight different directions, or scale can be ordered with a head that swivels through 360 degrees. Platforms of portable and bench models have been made larger. Heavy capacity models now have up to nine unit weights available in standard combinations.

For More Details Circle No. 25—Page 233

Cutoff Wheel: Norton Co., Worcester 6, Mass.—Improved, reinforced, resinoid, hub-type cutoff wheel known as the BFR wheel replaces one with the same designation that has been on the market. Tests show that increased life of up to one-third more than that of the former wheel can be expected with the same quality of cut. Manufacturer states that the new wheel offers better uniformity in grinding action from wheel to wheel and lot to lot. It is said to show practically no tendency to fray or split at the face in layers. Two abrasive types are available—one in 16, 24, 36 and 54 grit, the other in 16, 24 and 36 grit. Diameters are 7 and 9 in.; thicknesses are ⅛, 3/16, ¼ and ⅜ in. Hole size is ⅞ in. Grade is K.

For More Details Circle No. 26—Page 233

Fire Rescue Suit: Industrial Safety Specialties Co., Perkasie, Pa.—Fire rescue suit weighs 28 lb and is said to be donned without assistance in less than one minute and to allow freedom of movement under all fire



conditions. It has an outer layer of 90 per cent asbestos cloth plus 1 in. of fiber glass insulation covered with aluminum foil and an inner lining of vinyl-treated glass cloth which acts as a steam barrier. The suit also is available with an aluminized outer surface, for work inside boilers or furnaces where direct contact with flame is not involved. One-piece trousers cover from feet to 8 in. be-

Quality is Work...
not just a Word

Quality is a man in overalls and canvas gloves sorting metal. Years of experience tell him what is red brass, copper, silicon bronze, bell metal, lead, tin; or ferrous metal to be thrown aside.

Quality is a metallurgist selecting and assembling metals to be melted and balanced to meet the precise chemical contents specified in dozens of alloys required by industry.

Quality is a chemist testing samples of a melt until precise specifications are attained and he says it is time to pour.

Quality is millions of dollars invested in laboratories, research, storage, raw materials and distribution depots, so that Federated customers can be assured of specification products, uniform, *every* time.

Quality is the big staff of Federated representatives whose job is to share and solve the problems of the one-man shops and the big foundries that are Federated's customers.

Quality is the effort to achieve perfection . . . and the resources to apply that effort from the depths of the mine to the shipping-case which brings non-ferrous products to your place of business from Federated . . . Headquarters for Non-ferrous Metals.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.

In Canada: Federated Metals Canada, Ltd., Toronto, Montreal

Federated first in the non ferrous field SMD

Aluminum and Magnesium, Babbitts, Brasses and Bronzes, Anodes, Die Casting Metals, Lead and Lead Products, Solders, Type Metals

low arm pits, hooded blouse extends below waistline, and hood section contains a large, laminated safety glass window. Self-generating breathing apparatus also is available and provides sufficient oxygen for 15 minutes.

For More Details Circle No. 27—Page 233

Power Failure Alarm: Walter Kidde & Co., 260 Madison Ave., New York 16 — Power failure warning alarm is for use with the organization's industrial smoke detection equipment. Smoke detector is powered by 115-v ac and continuously draws air samples from as many as four protected rooms. In sequence, each sample passes through piping to the detection cabinet, where it is scanned for smoke by a photo electric cell. If any sample contains smoke, an audible alarm sounds, and the proper room is identified by an indicator on the detector box. The new addition reveals the unprotected condition immediately if the current fails and the fire detection apparatus halts. The 6-v, battery-powered device also causes an audible alarm to sound. Throwing a manual switch from "normal" to "bell silence" stops the ringing, and a red light on the panel flashes on instead to indicate the derangement.

For More Details Circle No. 28—Page 233

Fork Truck Scoop: Yale & Towne Mfg. Co., Yale Materials Handling Division, Philadelphia — Hydraulic scoop attachment for the firm's fork

lift trucks provides controlled dumping at any desired discharge rate and at any elevation up to the maximum lift height of the truck. Easily attached or removed, it is actuated by a double acting cylinder and with truck uprights vertical. Dumping angle down from the horizontal is 30 degrees, and backward angle, for handling loads without spillage, is 37 degrees.

For More Details Circle No. 29—Page 233

Heat Resistant Flooring: Flash-Stone Co., Philadelphia—Heat resistant flooring is said to withstand thermal shock and to avoid deterioration under extremely high temperatures. Designed to be used where temperatures range up to 2000°F, it disperses heat rapidly through aluminum rods embedded about 1 in. below the surface of the floor. These rods carry the heat from the contact area and spread it over a wide section of the floor. Flooring consists of hard-graded rock and sand combined with cements in a low-water ratio. Installation methods include compacting with very heavy, power-driven equipment that produces a density in the concrete greater than can be obtained with manual operations. Floor is ready for use 24 hours after installation.

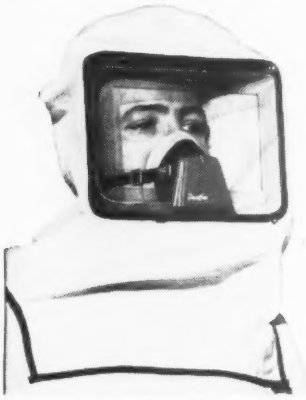
For More Details Circle No. 30—Page 233

Dehumidifier: Van Products Co., 3779, West Twelfth St., Erie, Pa.—Self-cleaning dehumidifier purifies compressed air and reduces humidity to a very low dew point, acording to the manufacturer. Improvements include self-adjusting nozzle coupler with nonclogging aspirator. This automatic control stabilizes unit operation during variable air pressures and

"If your Respirators are GATHERING DUST on the shelf instead of TRAPPING DUST on the job . . . get the Respirators workers *will* WEAR . . . the M-S-A DUSTFOE #55"

Here are four good reasons why Dustfoe #55 users report tremendous increases in voluntary respirator acceptance among workers: (1) it's so light (2¾ oz.) workers hardly know they're wearing it; (2) its compact, streamlined design eliminates annoying "blind spots" and permits normal downward vision; (3) it's easy to breathe through; (4) it fits the face comfortably, no pressure points.

Workers know, too, that the approved filtering action gives them top protection where dusts are not significantly more toxic than lead. Our bulletin gives complete details.



THE M·S·A DUST HOOD . . .

protects eyes, head, face and neck from irritating or nuisance dusts

This comfortable, roomy hood keeps the wearer "under cover" in those areas where irritating or nuisance dusts are a threat. Made of Dynel cloth for extra protection and wearing qualities, this hood gives the worker full job vision. The large plastic window, Dustfoe #55 Respirator, and filter are independently replaceable.

MSA SAFETY EQUIPMENT HEADQUARTERS

Call the M.S.A. man on your every safety problem . . . his job is to help you

MINE SAFETY APPLIANCES COMPANY

Braddock, Thomas and Meade Streets, Pittsburgh 8, Pa.

At your Service: 76 Branch Offices in the United States

MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED

Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.

Representatives in Principal Cities in Mexico, Central and South America

Cable Address: "Minsaf" Pittsburgh

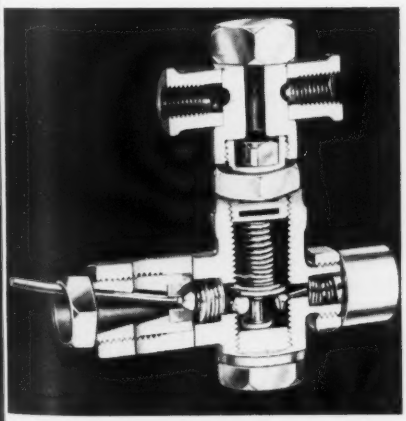
volumes and insures constant removal of contaminants. Baffle surfaces have been enlarged and repositioned for greater exposure of contaminants to the drying agent, a larger area for separation of heavy impurities and for better accommodation of momentary overloads. The self-cleaning drying agent is compounded to cover a range of line temperatures from 100° F to below freezing.

For More Details Circle No. 31—Page 233

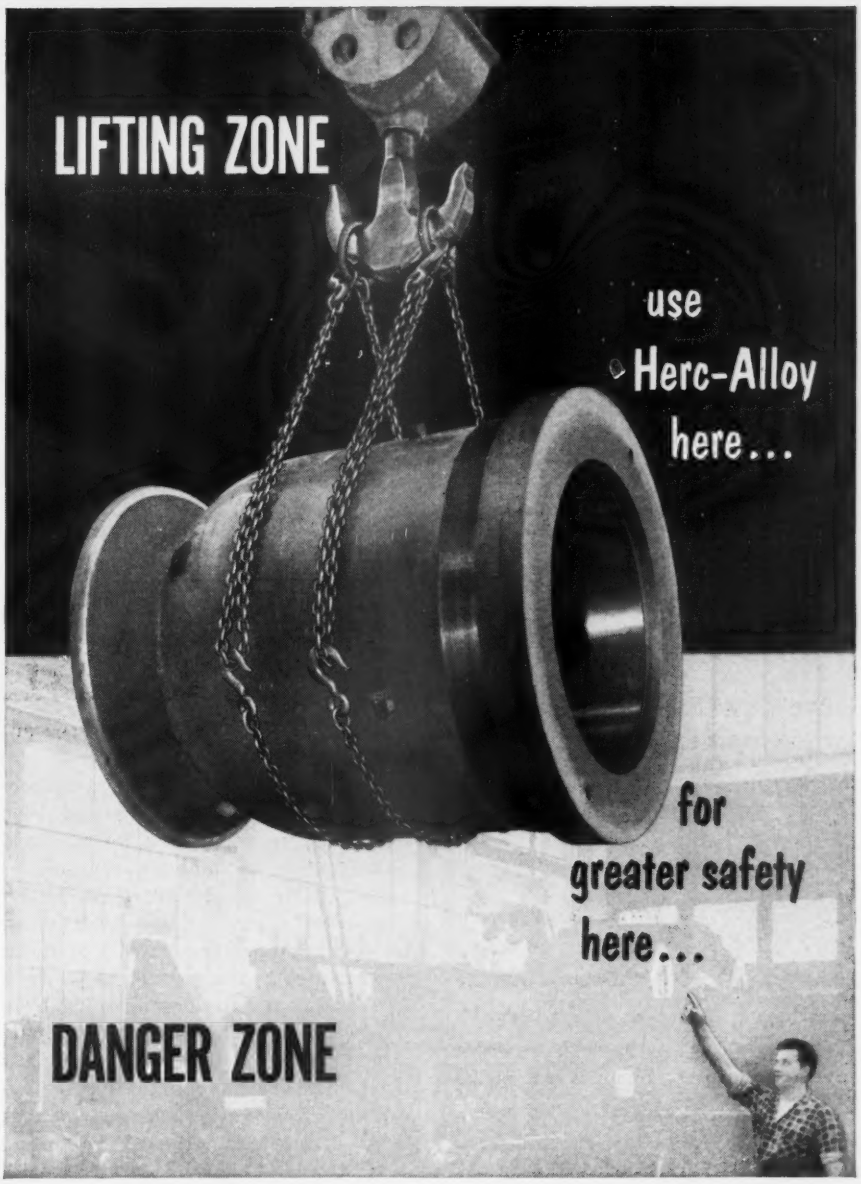
Plate Filter: Eclipse Fuel Engineering Co., Rockford, Ill.—Edge type plate filter for use with the company's closed flame gas-oil burner is said to separate all solids from fuel oils easily and quickly without stopping oil flow. Thorough filtration is accomplished by passing the oil between discs of metal precisely separated by spacers of the right thickness for the particular oil. Solids larger than the spaces between the discs cling to the edges; only clean oil passes through. Center space within the discs is connected to the filter outlet and provides a means for the exit of the filtered oil. Turning a handle removes solids accumulated on the cartridge. Cleaner blades are designed so that all solids are removed and settled in the sump.

For More Details Circle No. 32—Page 233

Wobble-Rod Valve: Pantex Mfg. Co., 521 Roosevelt Ave., Pawtucket, R. I.—Wobble-rod valve for pneumatically operated equipment can be actuated manually, mechanically or



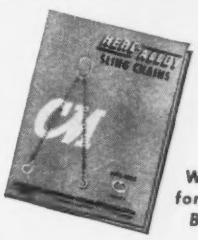
electrically by any type of motion because the rod which opens and closes the valve is so swiveled that the free end can move vertically, laterally, diagonally or in arcs and circles. The valve can be spring-loaded so that it normally remains open rather than closed. An internal exhaust valve in the main valve will discharge an air cylinder, line or receiver when the valve closes, but can be eliminated where it is desirable to hold air line pressures after the valve has done its job. A check valve located ahead of



SPECIFY

HERC-ALLOY

SLING CHAINS



Write for Data Book

HERC-ALLOY Sling Chains are made-up to order, are individually tested, registered and guaranteed.

Hundreds of plants like the one shown above* are using Herc-Alloy Sling Chains. Greater safety is their big reason for doing it. But there are other factors too. Herc-Alloy is economical because of its long service life. Then too, the use of alloy steel permits a weight reduction that helps prevent worker fatigue. These advantages are worth thinking about. Those who do consider them seriously generally adopt safe Herc-Alloy Sling Chains for their plants.

*LAKE ERIE ENGINEERING CORPORATION — MANUFACTURER OF HYDRAULIC PRESSES

CM HOISTS AND CHAIN

COLUMBUS McKINNON

CHAIN CORPORATION

TONAWANDA, NEW YORK

DISTRICT OFFICES: NEW YORK, CHICAGO, CLEVELAND

In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

"PROFESSORS OF FOUNDRYOLOGY"
present
KORWELD

the new FMC core paste development. . . .

Foundry users claim that it is 80% STRONGER

Develops 1/2 to 2/3 LESS GAS than any thing they've ever used

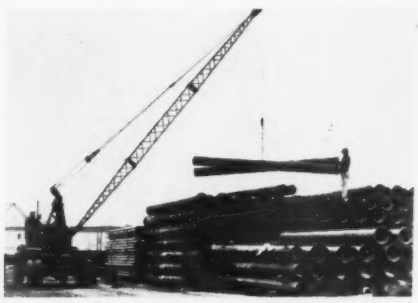
These two facts are worth remembering. They are the main reasons why KORWELD is not simply another core paste. KORWELD actually welds core seams by its ability to penetrate deeply into the core and around the sand particles. Instead of forming merely a surface weld, it grips into the actual grain. KORWELD dries faster and gives a greater tensile strength than ordinary core paste. This largely eliminates "waiting time", which is a special advantage in production work. KORWELD is a scientific blending of materials which greatly increases moisture resistance, giving added strength and safety in core storage. It reduces the possibility of core slipping or falling apart in the mold cavity. KORWELD helps eliminate trouble from gas formation. It is often used as a daub. You can't join the list of satisfied users until you try KORWELD. And until you try KORWELD you can't let this amazing core paste prove its wonders. Why not take a tip from our Professors of Foundryology, and order a trial barrel today?

FMC's incomparable sales assistance and service are at your disposal. We want you to try KORWELD and MASTERMIX. Write or phone us today.

the ball-and-seat prevents backsurge. Unit is constructed entirely of noncorrosive metals. Used as a pilot valve to actuate larger controls, it has a range of usefulness up to 125 psi. Open valve diameter is ¼ in.

For More Details Circle No. 33—Page 233

Truck Crane : Pitman Mfg. Co., 300 West 79th Terrace, Kansas City, Mo.—Truck crane with capacity up to 8000 lb on a 25-ft boom is designed for installation on ½-ton trucks or



larger. Inserts are available for additional boom lengths of 37, 48 and 59 ft, with maximum ratings respectively of 6000 lb, 3000 lb and 1000 lb. Loadline winch can be operated either power-up and power-down or free-spooling. This feature allows the operator to let the load down under full power or to slip it down with a foot brake as fast as desired. Precise boom action is afforded by a power-up and power-down topping winch which raises and lowers the boom and by a double acting hydraulic cylinder which swings the boom in a 180-degree arc. Maximum capacity loads can be topped with the boom. Controls are outside the cab, alongside the crane's main "A" frame. Loadline, boom topping and boom swing are controlled by three levers directly in front of the operator.

For More Details Circle No. 34—Page 233

Indicating Flowmeter: Seico Instrument Division, Grindle Corp., 16231 Turner Ave., Markham, Ill—Input calibrated indicating flowmeter is designed to enable operators of heat treating furnaces to judge correctly the right firing rate for any furnace load. Operation of the meter is based on fact that a loaded furnace requires progressively less fuel as it approaches a set maximum temperature or the control point. During heat treatment, the point of temperature stability is not a true indication of load saturation. Temperature may be assumed to be stable while it still is changing. The meter amplifies this point by measuring heat input continuously, indicates or records the decrease and shows true balance

"PROFESSORS OF FOUNDRYOLOGY"
present
MASTERMIX

in the new paste type core and mold washes.

1. **High refractory zircon wash for steel and heavy section gray iron castings.**
2. **All-purpose wash for steel or heavy gray iron castings.**
3. **Black wash for medium to light gray iron castings.**

BUY FMC

MASTERMIX HIGH REFRACTORY CORE AND MOLD WASH can be sprayed, brushed or swabbed. The best results are obtained when the wash is applied to green cores, or molds, before drying. If the wash is applied as recommended, the resulting castings will have smooth surfaces with no burning-in or metal erosion. MASTERMIX #1 has a refractory value of 3450° F. It has high hot strength and high dry strength, a low expansion rate and a fast chilling rate. The higher cost of this wash is more than offset by the material savings and improved casting finish it makes possible.

FOUNDRIES MATERIALS CO.
Coldwater, Michigan
★
DETROIT SALES OFFICE:
15234 Michigan Ave.
Dearborn, Mich.

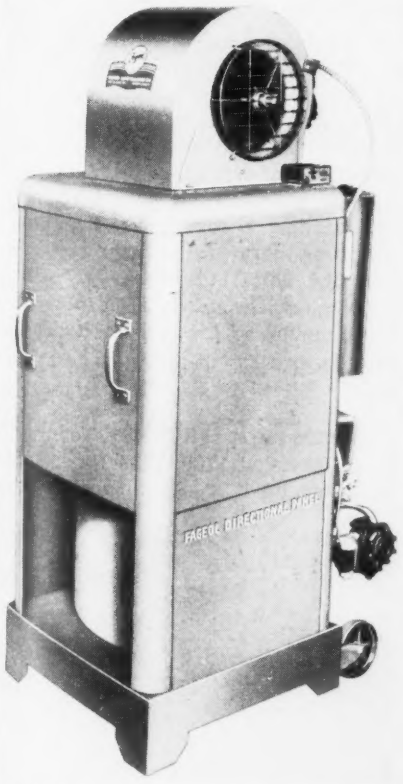
point. Meter is furnished as an indicator only, but it can be had as a recorder. Either instrument can be equipped with mercury switches to signal saturation point of the load or to change the process.

For More Details Circle No. 35—Page 233

Wheel Guards: Morrison Products Inc., 16816 Waterloo Rd., Cleveland 10—Wheel guards for flaring cup and straight cup wheels were developed in collaboration with the safety committee of the Grinding Wheel Institute and meet the specifications set forth in the American Standard Safety Code. Reported to provide maximum protection without interference with work, they are lightweight and easy to assemble. The guards are approved on threaded hole insert wheels which are so designed that the wheel is held securely in place after breakage. An outer flange, or adapter, is for use with clear hole wheels. Guards revolve with wheels and do not cut down visibility.

For More Details Circle No. 36—Page 233

Heat Directing Panels: Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11—Heat directing side

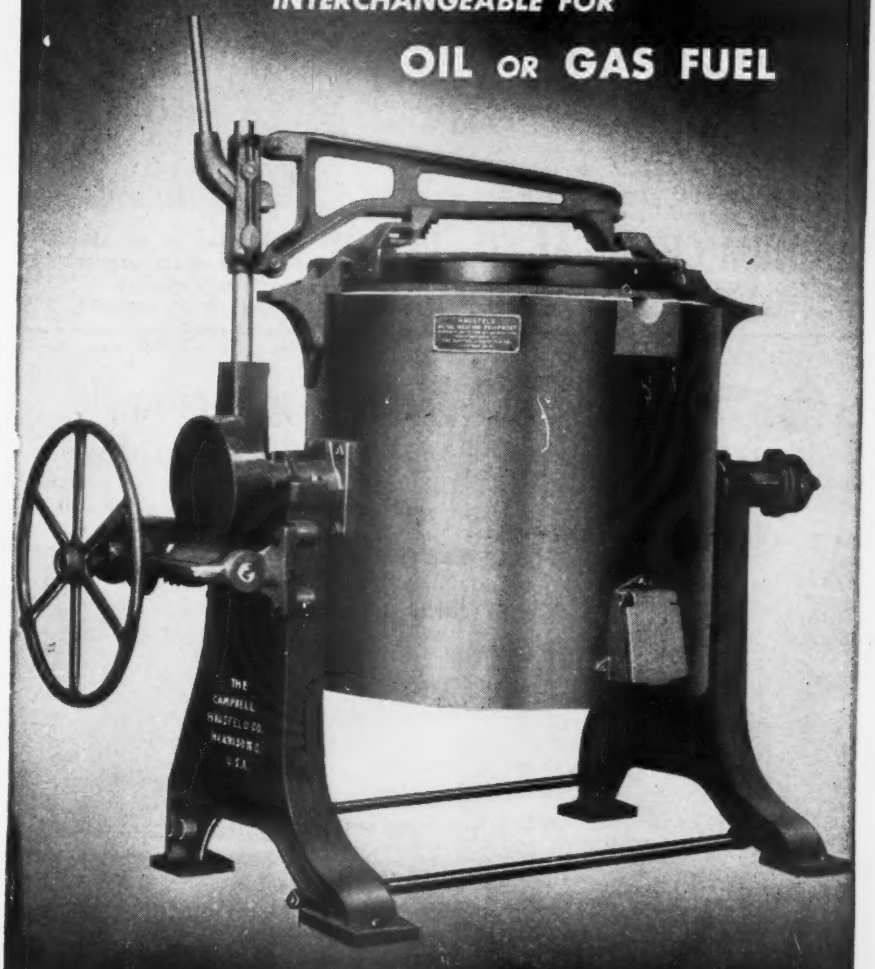


panels for use with the company's Model PW-189 heat machine are made of heavy sheet steel and cover heat outlet openings. Said to be quickly and easily attachable, they can be used singly or in pairs to direct heat as desired. Ordinarily heat sprays out in three directions, but the pan-

HAUSFELD

A FURNACE FOR EVERY NON-FERROUS MELTING REQUIREMENT

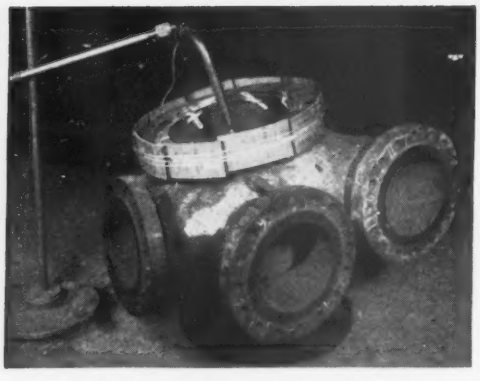
INTERCHANGEABLE FOR OIL OR GAS FUEL



Built for Service

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO



Radiographing a flange on a heavy steel casting.

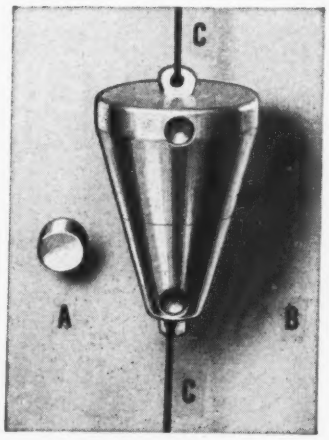
BUY . . . RENT . . . OR LEASE OUR RADIUM RADIOGRAPHY KIT

. . A Short cut to more productive and economical foundry practice

The use of gamma rays in radiographing steel castings has greatly increased since 1930, when the first commercial use of radiography was introduced. Radium radiography is simple, economical and effective; because it may be rented or leased, the equipment doesn't require a capital investment. It is simple to operate because it doesn't require especially skilled operators. Today radium radiography is rapidly approaching the status of standard equipment in progressive steel foundries. Let us tell you more about the simplicity and economy of radium radiography. Write today for prices, terms and case histories. Your requirements promptly supplied.

RADIUM CHEMICAL CO., INC.

161 East 42nd St., N. Y. Chicago: Marshall Field Annex Bldg. Los Angeles: 3723 Wilshire Blvd.

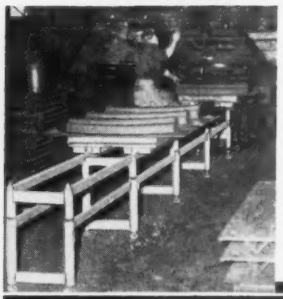


The apparatus is as simple as
A—small radium capsule
B—cartridge container
C—rigid string support

NOMAD CONVEYOR SYSTEMS are based on a principle as logical as mounting a box car on wheels!

Look at these features

- Low initial cost
- Adjustable height track
- No vibration for molds or cores
- Simple installation
- Self-cleaning rails
- Low maintenance cost



Our engineers will design single or double track (bottom board return) conveyor to meet your specific requirements.

Write today for full information

NOMAD FOUNDRY EQUIPMENT

Patented Patents Applied for

Manufactured by
WESTOVER ENGINEERS
3110 W. FOND DU LAC AVE.,
MILWAUKEE 10, WIS.

els permit channeling it in either one or two directions, as required by any specific application.

For More Details Circle No. 37—Page 233

Sketching Kit: California Visual Aids Co., 6214 West Manchester, Los Angeles 45—Perspective sketching method is reported to enable persons in creative fields who do not have drawing experience to present their ideas clearly in perspective sketches. Kit includes an 8½ x 11 in. template made of clear, 0.020 vinylite plastic sheet and a 24-page example book of instructions, boxed and punched for three-ring binders. The sketching template is processed with five black lines within a rectangle that act as guides in the sketching of a technical subject. They are horizontal and vertical reference lines in perspective that furnish a common starting point for all sketches by automatically locating, in relation to each other, the major parts of the subject to be sketched.

For More Details Circle No. 38—Page 233

Utility Hose: Quaker Rubber Corp., Division of H. K. Porter Co., 1932 Oliver Bldg., Pittsburgh 22—Wire-reinforced utility hose for work which requires extreme flexibility and resistance to high pressure can be used as an air, oil, water, gasoline or spray hose or for hydraulic lines at working pressures as high as 1500 psi. Made with a nonporous, oil-resistant tube, the hose is reinforced with two separate braids, one of steel wire, the other of rayon. The steel wire braid is grounded to provide a positive conductor for static electricity. Neoprene cover is yellow, for easy visibility. Hose is made in ⅜ to 2-in. ID sizes with either high pressure, reattachable or pressed on hydraulic fittings.

For More Details Circle No. 39—Page 233

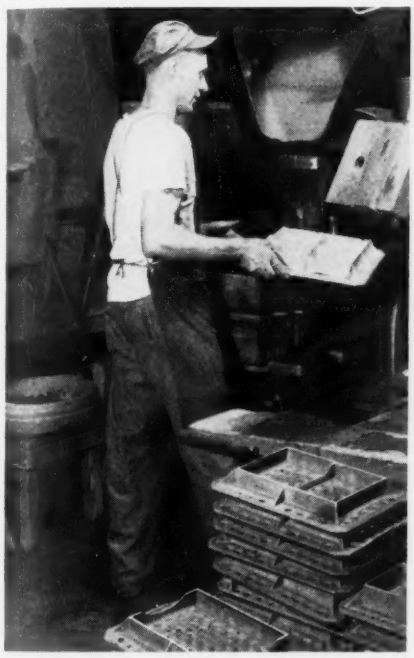
Diesel Fork Trucks: Towmotor Corp., Division 1709, 1226 East 152nd St., Cleveland 10—Company now is

offering five of its most popular fork lift trucks with Continental diesel engines. These models include 460-D, 480-PD, LT-56-D and LT-62-D. Exhaust from these trucks reportedly

is practically free from carbon monoxide. Running records are said to indicate low operational costs.

For More Details Circle No. 40—Page 233

Aluminum Bottom Boards: R & J Foundry Co., 610 South 94th St., Milwaukee 14—Aluminum bottom boards have been developed and improved so that both metal composition and mechanical construction enable them to give longer service and to take more punishment than they did previously, although they weigh less. New gas release vents have been



added, so that they are in the sides as well as in the top. Custom-made bottom boards can be supplied to a foundry's own design or size requirements.

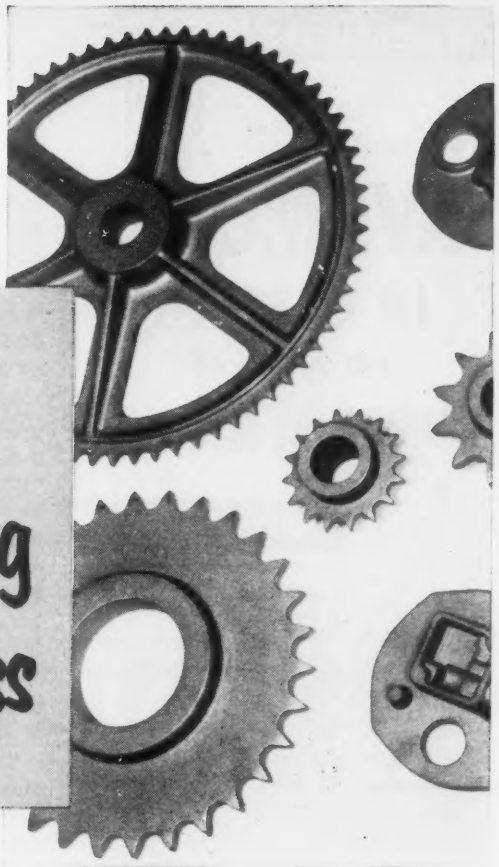
For More Details Circle No. 41—Page 233

Extensometer: Tinius Olsen Testing Machine Co., 1166 Easton Rd., Willow Grove, Pa.—Lightweight, high-magnification extensometer for gage lengths of 4/10 or ½-in. is available for 1/16 to ⅜-in. diam specimens. The 4/10-in. gage length model is recommended for standard 0.113-in. diam specimens. The extensometer is for use with the firm's electronic recorder for detecting strain under both elastic and plastic tension tests. Easily snapped onto the specimen, the instrument is provided with magnifications of 50, 100 and 200, instantly available by the turn of a switch. Over-all dimensions are about ¾ x ⅞ x 1 in. Operation is said to be simple and accurate. Unit returns to zero (start) position when used within the elastic limits of the specimen. Backlash eliminators are built in.

For More Details Circle No. 42—Page 233

Foundries are proving that

A lot of machining is needless



...another case where Durez produced the right answer in RESINS

● A revolution in casting methods now under way in the nation's foundries is destined to save millions in manufacturing costs.

With the new method, metal castings produced in Durez resin bonded shell molds conform to required dimensions very closely, and have such smooth surfaces that in some cases machining is eliminated completely. One large casting that formerly required 27 pounds of metal removal per piece now needs less than three.

Success depends largely on the bonding resins. Working with leading foundries from the start, Durez has perfected a phenolic resin with exceptionally fast cure and rigid set. The resin facilitates mass production and makes it easier to obtain castings with desired qualities of structure, dimensional accuracy, and finish.

This is one way in which Durez — leading specialists in phenolics — has contributed through research to industrial advance. Others are in the fields of abrasives, rubber, wood waste utilization, paper products, printing inks, wax emulsions, and of course, plastic molding compounds.

If you have a product or process that may call for the mechanical, chemical, and electrical values inherent in phenolics, why not talk things over with men who specialize in them? Our experience is at your service.

Our monthly "Durez Plastics News" will keep you informed on industry's uses of Durez. Write, on office letterhead.

DUREZ PLASTICS & CHEMICALS, INC.
1012 Walck Road, North Tonawanda, N. Y.

PHENOLIC PLASTICS THAT FIT THE JOB

question:

How can you

SAVE MONEY

IN CASTING

all types of

ALUMINUM ALLOYS?

answer:

USE

FOSECO

COVERAL

for these important reasons:

1. Produces metal-free dross.
2. Prevents oxidation.
3. Economical and easy to use.
4. Dissolves oxides.
5. Increases fluidity.
6. Creates no fumes.

FOSECO COVERALS are the most efficient covering compounds yet produced. Nearly a quarter century of "know how" and experience help you obtain BETTER aluminum castings at LOWER cost. You save metal—have fewer rejections.

There's a FOSECO COVERAL made for every type aluminum casting. Tell us the alloy you melt, type furnace and pouring temperature—we will be glad to recommend the proper FOSECO COVERAL for your requirements.

WRITE TODAY—ASK ABOUT OUR "NO RISK" TEST

FOUNDRY SERVICES, Inc.
280 Madison Ave., Dept. F
New York 16, N. Y.
FOUNDRY SERVICES *(Canada)* LTD.
201 Alice Street, Guelph, Ontario

Quality Control

(*Continued from page* 124)

fective analyses sheets to get these data The graph readily indicates trends and if kept for several years will immediately detect any existing seasonal trends. The graphs are in effect p charts, without limits, and no technical knowledge of statistics is required for their development. If properly utilized, they can be instrumental in reducing scrap.

Informing the Workers—The job of improving the quality of castings poured at Buffalo Works was tackled using popular advertising techniques to reach the worker level. By calling the workman's attention to the amount of castings that had to be scrapped because of defects, he could be made conscious of scrap. It was logical that if a good portion of the plant were scrap conscious, even on one specific job, it would undoubtedly lower scrap loss.

To stimulate curiosity and discussion on the scrap problem, many posters were placed throughout the foundry very secretively. These signs, such as in Fig 9, had key letters and numbers based on data obtained from several troublesome, high-production jobs. Data on short-run jobs would not fall into a consistent pattern and were avoided. The plot was kept a secret and the signs were posted on Sunday. On Monday, the plant actually buzzed with curiosity. Guesses on what "OOOF" or "¼" meant varied from blood donor quotas to a bond drive campaign. The fact that no one recognized this as a scrap campaign pointed out very effectively the need for advertising scrap rates.

On the appointed day, as advertised, the mystery was solved through another series of posters, one of which is shown in Fig. 10. These were designed to depict the scrap rate then current in the plant on the selected, high-production parts. Word of mouth, as well as other posters, served to indicate to workers which parts were being evaluated. Oddly enough, just as advertising began, the scrap rate on the selected jobs dropped. Immediately a series of cartoons was posted giving plant personnel a pat on the back (Fig. 11). These posters continued to encourage interest in scrap reduction; and previously unconcerned personnel were interested in the progress made in lowering the scrap rate.

Since interest continued to flourish, posters were employed to stimulate a shift pride and a friendly rivalry

FOR THE

"HOT SPOTS"

IN YOUR PLANT

McDonald

ASBESTOS HOOD

Eliminate the dangers of heat exposure for open-hearth men, others who work with high temperatures! McDonald asbestos hood covers head, face and neck — insures safety! Handy knob control adjusts size. When not in use, hood may be hung from convenient storage loop in crown.

WRITE TODAY for information on McDonald Asbestos Hood or other items in the complete McDonald line of safety clothing. No obligation.

B-F-McDonald
COMPANY
Manufacturers & Distributors of
Industrial Safety Clothing & Equipment

5721 West 96th St., Los Angeles 45
Other Offices in San Francisco and Houston

between shifts. One poster each month was used to compare scrap produced on each shift; the data were still obtained from the same production universe but in more detail.

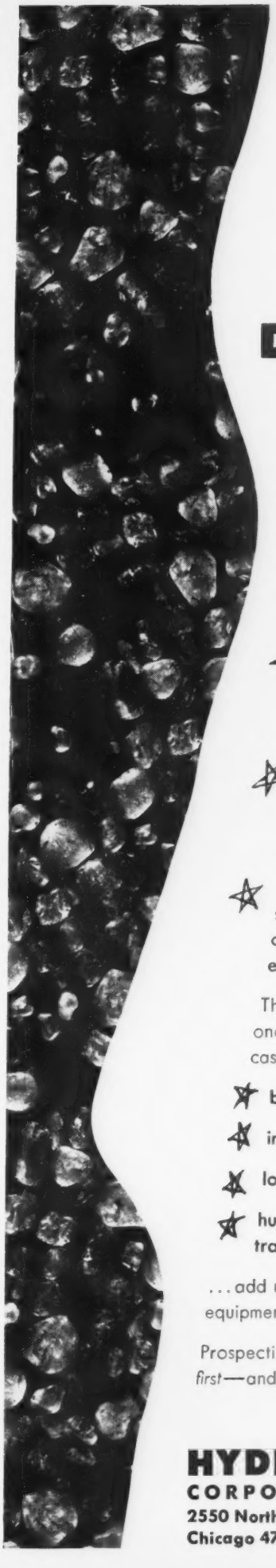
Since group competition as developed by this program might become harmful, it must be held within bounds. If allowed out of control, it could develop a jealousy which in turn would hinder co-operation. For example, a molder on one shift may have a special trick in ramming a mold, placing a vent, or reaming a riser; and because of it keeps his scrap low on a given job. If he guards it jealously to prevent the molders on the other shifts from improving their records, he is retarding plant-wide improvement. Laurels should be passed out where they are due, but at no time should they infer any degradation of groups which have the poorer records. If this same molder is shown that his record is appreciated, he himself will usually volunteer his secret so that it can be passed on to others.

This discussion has brought out the fact that it is not always necessary to enter into extensive, technical calculations to make statistical quality control work. Statistics, as has been said many times before, are only a tool with which to delve out information. Alone they are useless in reducing scrap and rework. It is essential to disseminate to as many as possible the information which statistics have cataloged and clarified.

If the technique of publicizing this information is kept simple, more people will be reached and, consequently, scrap and rework will be more drastically reduced. It must be remembered that in a jobbing foundry application, it is almost imperative that some type of a psychological approach be used, because in effect the variability of men is being evaluated more than the variability of machines.

Atomic Report Reprinted

A second printing has made available again Stanford Research Institute's report to the United States Atomic Energy Commission on the "Industrial Uses of Radioactive Fission Products." Copies may be obtained from the institute's public relations office, Stanford, Calif., for $1.50 each. Submitted originally in September, 1951, the report describes specific applications of radioactive wastes from operation of AEC nuclear reactors.



Do you realize that . . .

- nearly 90% of all sand reclaimed in U. S. iron and steel foundries is reclaimed by Hydro-Blast equipment
- about 5000 tons per day of used sand is reclaimed by Hydro-Blast
- sand reclaimed by Hydro-Blast is equal, often superior, to new sand—produces better quality castings; *many foundries prefer sand reclaimed by Hydro-Blast*
- more than 200 foundries have sent refuse sand for big-scale Hydro-Blast pilot-plant tests—and 90% *of that sand was returned for production use*
- only Hydro-Blast has studied sand chemistry and sand reclamation continuously since 1935, and offers you a wealth of unique engineering experience

There's no field of potential savings so rich as this one of reclaiming refuse sand; and tremendous cash benefits from

- better quality of castings
- increased production
- lower rejection rate
- huge cuts in costs of sand and sand transportation

. . . add up to speedy amortization of Hydro-Blast equipment: *usually within two years or less!*

Prospecting for a "sure thing?" . . . talk to Hydro-Blast *first*—and *last*.

HYDRO-BLAST
CORPORATION
2550 North Western Avenue
Chicago 47, Illinois

Annealing of Gray Iron

(*Continued from page* 111)

hardness is shown for a different iron in Fig. 9.

In most cases, an annealing temperature of between 1300° F and 1400° F is recommended[6],[7],[8]. Exact temperature recommendations within this range are difficult to establish, depending as they do on the composition of the iron. In most cases where any considerable number of castings is to be annealed and maximum machinability must be obtained, the safest procedure is to anneal a number of samples at various temperatures between 1300° and 1400° F and determine the temperature that yields the lowest final hardness. If strength properties are specified it will be necessary to check tensile strength of the castings and select the annealing temperature which results in the most advantageous combination of properties for the particular application.

The time during which the casting is held at temperature must be sufficient to allow the graphitizing process to go to completion[8]. At temperatures below 1300° F the holding time should be about one hour per inch of cross section. At temperatures in the range of 1300° to 1400° F, the time is sometimes cut to 45 minutes for each inch of section[6]. If an unusually slow rate of cooling is employed, the time at temperature may be cut even further[4].

Recommends Slow Cooling

Although the rate of cooling is not of very great importance to the annealing process itself, slow cooling is recommended if advantage is to be taken of the stress-relief which automatically occurs as the casting cools through the lower ranges. A maximum cooling rate of 100° F per hour down to 550° F is recommended[4],[5],[6]. (See preceding article on stress relief, FOUNDRY, August and September.)

Medium Anneal—Many people regularly engaged in heat treating gray iron commonly employ a medium or "full" anneal (curve B_1 in Fig. 7) at temperatures between 1450° and 1650° F. Presumably, the medium anneal is used in cases in which the low-temperature anneal has proved insufficient because of high alloy content of the subject iron.

Holding times comparable to those of the low-temperature anneal are usually employed. If such high temperatures as these are used, it is necessary to allow the casting to cool slowly through the critical range (1450-1250°), because above the critical point the graphitic carbon will go into solution in the iron and may separate out as pearlite upon rapid cooling.

It should be noted that, according to the best obtainable information, many of those heat treating gray iron are using a medium anneal where a low-temperature anneal would be sufficient or even preferable. Such practice traces back to annealing practice using steel and has no reference to gray iron. It is recommended that in every case, tests of the efficacy of temperatures at or below 1400° F should be made before the use of a higher annealing temperature is adopted as part of standard procedure.

High-temperature Anneal — If the combined carbon is present in the form of massive cementite as in mottled or white iron, a more drastic treatment is necessary. The process in this case may simply have the purpose of converting free cementite to pearlite-graphite, although in some cases it may be desired to carry decomposition all the way to a pure ferrite-graphite structure.

Acknowledgment

The author would like to express his gratitude and acknowledge the help of numerous foundrymen who have made suggestions for this and previous chapter-manuals, and in particular the work of Franz Brotzen and Charles O. Burgess Jr., who prepared the bibliography and helped to formulate the articles themselves.

Production of free carbide that must later be removed by annealing, except in the case of pipe and permanent mold castings, is almost always an accident resulting from cooling a given iron at too rapid a rate to permit normal graphitization, and the annealing process is therefore not considered as part of any normal production cycle.

To break down these massive carbides so detrimental to machining, temperatures of at least 1570° F are required[4]. Practically, it is generally advisable to heat castings containing chilled spots to a temperature of 1650° to 1750° F[5]. It has been recommended that the holding time be estimated at one to three hours plus one hour per inch of section size; however, with some high-carbon irons, such as pipe irons, chill can be eliminated in 15 minutes at 1720° F. In all cases, unless a controlled-atmosphere furnace is used, the time at temperature should be as short as possible, because at these high temperatures, gray iron is susceptible to scaling[9].

An upper limit of 1750° F has been arbitrarily established for gray iron, since above this temperature there is a tendency for exudation or melting of the phosphide eutectic present in irons with over 0.30 per cent phosphorus[10]. The cooling rate chosen depends on the final use of the iron. If the principal object of the treatment is to break down carbides, and it is desired to retain maximum strength and wear resistance, the casting should be air-cooled from the annealing temperature to about 1000°F to promote the formation of a pearlitic structure.

If maximum machinability is the object, the casting should be furnace-cooled to 1000°F with special care to slow cool through the critical range[4]. In both cases cooling from 1000° F to about 550° F at not more than 100° F per hour is recommended to avoid internal stresses.

(*To be concluded next month*)

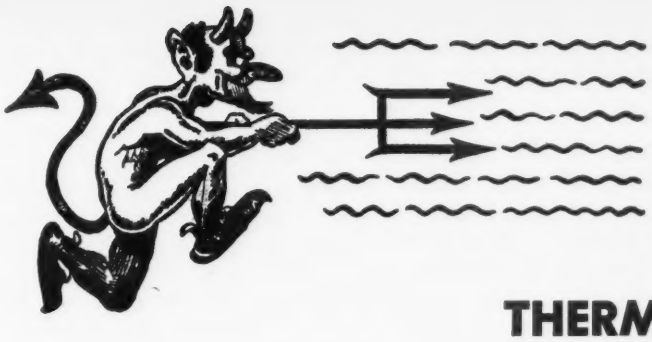
BIBLIOGRAPHY

1. "Increased Production, Reduced Costs through a Better Understanding of the Machining Process and Control of Materials, Tools, Machines." U. S. Air Force Researches Planning Section, Industrial Planning Division, Air Material Command. Curtiss-Wright; Wood-Ridge, N. J., 1950.
2. "Soft Cast Iron," L. W. Bolton. *Bulletin, British Cast Iron Research Association*, vol. 41, July, 1934, p. 6-10.
3. "Progress in Heat Treatment of Alloy Cast Iron," J. S. Vanick. FOUNDRY, vol. 71, July, 1943, p. 90-92, 178-179; August, 1943, p. 96-97.
4. "Heat Treatment of Cast Iron." Report and Recommendations of Sub-Committee T. S. 31 *Foundry Trade Journal*, vol. 91, Aug. 2, 1951, p. 117-124.
5. "Engineering Properties of Heat-Treated Cast Irons," J. S. Vanick. *Transactions*, AFS, vol. 54, 1946, p. 460-464.
6. "Around Detroit," A. H. Allen. FOUNDRY, vol. 77, April, 1949, p. 122.
7. "Recent Heat Treating Developments." C. F. Joseph. *Journal*, SAE, vol. 57, August, 1949, p. 56-57.
8. "Meehanite Tables." *Machine Design*, vol. 19, May, 1949, p. 147-150.
9. "Notes on the Heat Treatment of Gray Cast Iron," M. Bader. *Engineering Digest*, vol. 1, February, 1944, p. 165-167.
10. "Annealing Iron Casting for Machinability," A. W. Demmler, AFS, Preprint 53-80, 1953.

1952 Accident Rates Booklets Are Ready

The 1952 series of "Accident Rates" booklets, each booklet referring to a separate industry, is now available from the National Safety Council, which prepares the series annually. Each booklet contains the 1952 accident experience of all companies that report to the National Safety Council.

Twenty-two industries are included in the series, including the foundry, steel, iron and steel products and nonferrous metal products fields. All may be purchased from the council, at 425 North Michigan Ave., Chicago 11. For members, the pamphlets are 35 cents per copy in quantities from 1 to 99 and 29 cents per copy in quantities of 100 or more. For nonmembers the above prices are double.



Soffel's

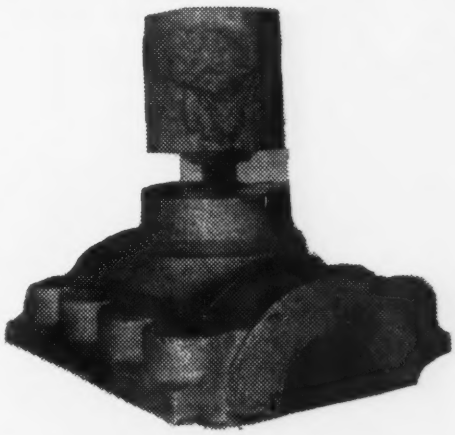
THERMOTOMIC® COMPOUNDS and CARBON FREE LIQUIDIZERS

Keeps metal molten!

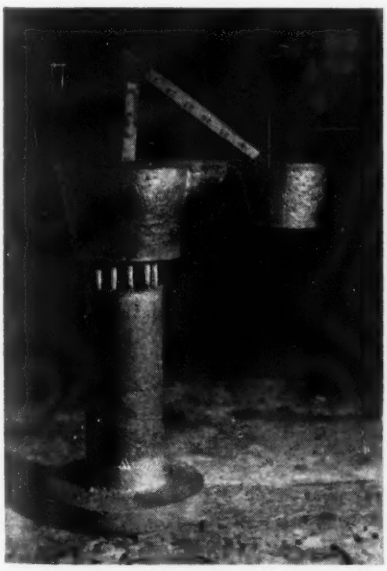
. . . for Steel, Iron, Aluminum, Brass, Bronze, Copper

THERMOTOMIC "X" is a patented exothermic compound that produces a temperature over 3500° F. It can be molded or baked into any desired shape the same as sand cores. THERMOTOMIC "X" is used as knock off core rings with 1½ inch feeder openings under risers of feeding heads, also as insulating sleeves, inserts and facings, or mixed with facing sand where it is desired to maintain fluidity of the casting metal. Shorter and more compact heads and risers can be used. The small feeder opening permits easy removal of feeding heads and risers. In conjunction with THERMOTOMIC COMPOUNDS, we recommend the use of exothermic CARBON FREE LIQUIDIZER NO. 5 on top of the metal in the heads or risers as an insulating cover. For green sand casting molds, use THERMOTOMIC WP (Waterproof).

U. S. Patents No. 2,490,327 and No. 2,500,097



300 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.

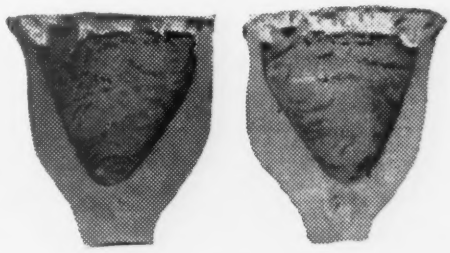


THERMOTOMIC STRAINER CORE

Produces Monel Casting 270 lbs. solid

Made by direct pouring through the Thermotomic strainer core under the feeding head.

No chills were used, no shrinkage at the flange. Note depth of shrinkage in the feeding head.



NOTE THESE TYPICAL RESULTS FROM THE USE OF SOFFEL'S CARBON FREE LIQUIDIZER

With the application of 1 pound of SOFFEL'S CARBON FREE LIQUIDIZER, this 6" x 6" chrome-nickel-steel riser was reduced in weight from 32 pounds to 13 pounds average. A savings of 19 pounds of salable metal, normally discarded as scrap, was fed into the casting and produced a heavier, sounder casting. Note the feeding head can be knocked off easily, saving burning costs. There is no better feeding head compound at any price than SOFFEL'S CARBON FREE LIQUIDIZER.

BEWARE OF IMITATIONS! We are the originators of CARBON FREE LIQUIDIZER and THERMOTOMIC COMPOUNDS

Pittsburgh Metals Purifying Company

WORLD'S LARGEST MANUFACTURERS OF FLUXES AND PURIFIERS FOR ALL METALS AND ALLOYS

1352 MARVISTA ST., N.S. **PITTSBURGH 12, PA.**

International Congress

(*Continued from page* 125)

composition can be adjusted to suit various requirements. Contraction is low. A section of the paper is devoted to the use of Norwegian electric iron for making steel castings in a basic furnace.

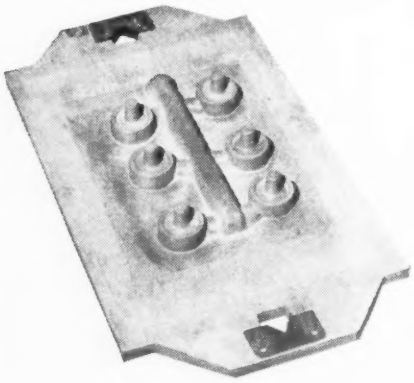
Practical Use of a Ternary Diagram for Alloy Cast Iron, by A. W. J. van den Bergh, director of the research laboratory of Kromhout Motoren, Amsterdam. The author explains the use of a ternary diagram, based on Weichelt's diagram, which permits of determining the quality of an alloy cast iron, using only one standard test piece of a diameter of 30 mm and a length of 650 mm.

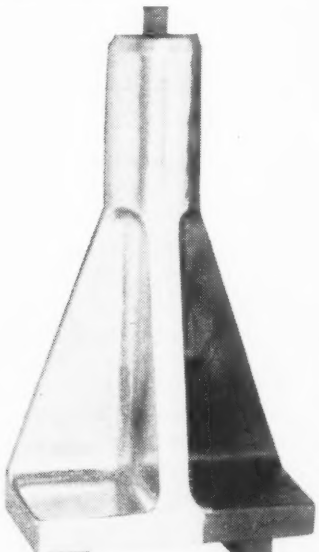
The Influence on Cast Irons of Hydrogen Introduced by Electrolytic Action or by Attack by Diluted Acid, by Paul Bastien, professor; Pierre Azon, lecturer, and Mlle. Christiane Winter, laboratory assistant, Ecole Centrale des Arts et Manufactures. The direct attack by acid solution causes a certain amount of corrosion which masks the influence of hydrogen. When attacked electrolytically, the behavior of the iron differs as between malleable or nonmalleable irons. Malleable iron behaves like steel: Increase of the capacity of absorption with the duration of the treatment; relatively sharp drop in the value of mechanical properties; recuperation of these properties when withdrawal of the hydrogen is effected. Nonmalleable iron shows a maximum of absorption of hydrogen in the course of attack and a maximum of brittleness. The resulting behavior depends on the matrix of the iron, while the recuperation of mechanical properties depends upon the methods of treatment used.

Investigations on Enameling Cast Irons, by V. Montoro, E. Lossa, A. Giussani and E. Giussani, Politecnico di Milano and laboratories of Osva. The principal causes of enameling defects on cast iron are: Inclusions, rust, method of preparation of the cast iron surface, variations of thickness of the casting; variations of the period of heating of the casting; type of enamel; variations of the thickness of enamel coating; variations in the period of heating of the enamel; structure of the iron; micrographic variations; effect of gases; temperature of the oven. Of primary importance is the adhesive properties of the oxide forming on the surface of the metal. The properties of the enamel in relation to the heating cycles are also important, and even more so, the local escapes for gas after coating with the enamel, especially during cooling.

Specifications and Testing of Spheroidal Graphite Iron, by Marcel Ballay, vice president of Centre d'Information du Nickel, Paris, and Jacques Grilliat. The only official specification is A 339—51 T 1951 of the A.S.T.M. In France there are three generally accepted types, one of 58 Kg per sq mm (41 tons per sq in.) that requires no heat treatment, one of 50 Kg (35 tons per sq in.) which can be heat treated but not necessarily, and one of 42 Kg (30 tons per sq in.) which requires a ferritic heat treatment. These three types are discussed and the methods of testing are explained in each case. The bending test on bars of 6 mm diameter is recommended to define the iron of a thin casting, or when, in order to investigate the homogeneity of a casting, the number of test bars is large and the volume of each bar is limited.

Spheroidal Graphite Iron and the Foundry Industry, by Donald J. Reese, International Nickel Co. Inc.





Make Your WOOD and CAST STONE Patterns work like METAL With —

MABCO ALUMINUM PATTERN PAINT AND PLASTIC

And at a fraction of the cost!

The Photographs show how you can have patterns that work like metal at as little as ONE-FOURTH the cost of metal patterns. Note the Cast Stone Match Plate above (left) coated with one thin coat of MABCO PATTERN PAINT. No finishing was attempted nor was it required to put the pattern into production.

Check the following features —

- √ Quick dry, paint-on metallic Aluminum coating which may be SANDED, FILED OR MACHINED when dry.
- √ May be used to build up or revamp metal or wood patterns
- √ Hot sand does not stick to coating.
- √ Impervious to moisture and most solvents.
- √ Is not affected by synthetic binders.

NOTE The solvent for MABCO PATTERN PAINT and MABCO ALUMINUM PLASTIC is MABCO THINNER.

Use no other solvent since the binder will not release ordinary solvents, rendering the material useless.

M. A. BELL COMPANY

217 Lombard St. • St. Louis, Mo.

"Serving the foundry industry for over 25 years"

HOUSTON DENVER

Many aspects of the impact of the development of nodular iron on the foundry industry are discussed. This new development is full of promise for the industry, and nodular iron will enable many parts to be cast in iron, for which iron castings were not previously possible or recommended.

The Impact Properties of Annealed Spheroidal Graphite Cast Iron, by A. L. Carr and Dr. W. Steven, Development and Research department, The Mond Nickel Co. Ltd., Birmingham, England. This was the official exchange paper of the Institute of British Foundrymen. Impact tests were made on bars taken from three typical castings of simple design which underwent annealing treatment. The authors studied the influence of silicon, manganese, phosphorus, residual pearlite, the shape of the graphite. Comparisons with malleable iron showed that brinell hardness is greater for nodular iron. It is shown that, for nodular iron, tensile strength is about proportional to hardness.

Heat Treatment of Spheroidal Graphite Cast Iron, by Marcel Ballay, past president, Association Technique de Fonderie; Raymond Chavy, member of the Council, and Jacques Grilliat, a French official paper. Nodular iron is often subjected to annealing in order to give it a ferritic structure susceptible of a certain degree of malleability; but nodular iron can also be subjected to other forms of heat treatment such as are used for steel The paper shows how such heat treatment can be applied to obtain: Graphitization of the combined carbon; transformation of the pearlitic structure into a ferritic structure; homogenization treatment; a martensitic structure by quenching and tempering; reheating below the A_{c1} point. Local hardening can also be obtained by a quenching treatment following: (a) a partial tempering in a lead bath, (b) tempering by high-frequency currents, (c) tempering with a blowpipe.

Determination of the Best Conditions of Testing Iron Castings by Gamma-ray, Using Cobalt-60, by Albert Blondel, and Pierre Broquet, Centre Technique des Industries de la Fonderie, Paris. The most important factors are: Distance between the source of radiation and the film, as related to the length of exposure and the necessity to obtain a clear picture; the nature of the film emulsion—coarse grains require shorter exposure but they affect the clearness of the picture. The authors

STANDARD HAS ENGINEERED AND BUILT FOUNDRY CONVEYORS SINCE 1906

Standard Conveyor Company has an experience record of almost a half century — engineering and building foundry conveyors. On any foundry handling problem Standard can aid you to select and install conveyors that will give you reduced handling time — uninterrupted smooth flow in production — careful safe handling of light or heavy molds — better storage facilities — and help conserve and better utilize existing foundry space.

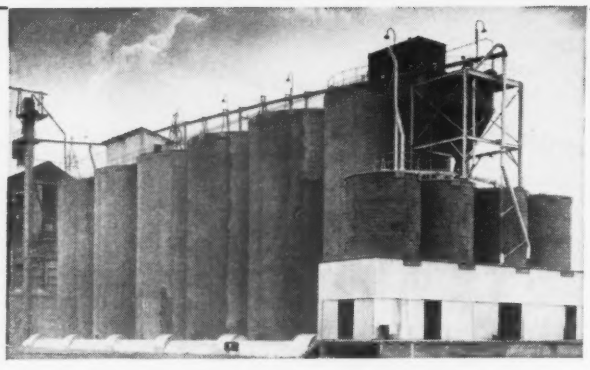
Available in a wide range of sizes, weights and types — equipped with shielded bearings expressly designed for severe foundry service — to suit a wide variety of foundry applications. Whatever your specific need, Standard is qualified by experience and facilities to recommend and furnish the right type of conveyors.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities
Engineered Conveyor Systems — Portable Conveyor Units — Spiral Chutes — Pneumatic Tube Systems

Send for Standard's special catalog "Conveyors for Foundries" — a valuable reference book illustrating and describing conveyor installations in leading foundries.

Standard
GRAVITY & POWER CONVEYORS

ENGINEERED FOR LOW-COST PRODUCTION



Trainloads of Alumina

Knowing that these ten Neff & Fry storage bins will hold 6,280 tons of alumina, you can imagine the potential quantity of products therein—grinding wheels, ceramics, pots, pans, truck and car bodies, girders, struts, sidings, roofs, paints, etc., etc.

The six larger ones are 30′ dia. x 60′ high; the four others, 15′ x 16′. They are owned by Reynolds Metals Company and located at Bauxite, Ark. The bins are filled and emptied by means of air slides.

This is just one example of Neff & Fry installations for handling and storing 85 kinds of flowable bulk materials—coal, grain, sand, ore, cement, clay, limestone, salt, soda ash, wood chips, for example.

Much of our work is building additional bins for old customers. They *know* Neff & Fry bins. You ought to be wise, too, if you produce or use flowable bulk materials. Ask for our literature.

THE NEFF & FRY CO. • 214 Elm St. • Camden, Ohio

SUPER-CONCRETE STAVE STORAGE BINS

Here's what Industry has to say about REDA melting Furnaces . . .

nothing but praise for the REDA FURNACE . . .

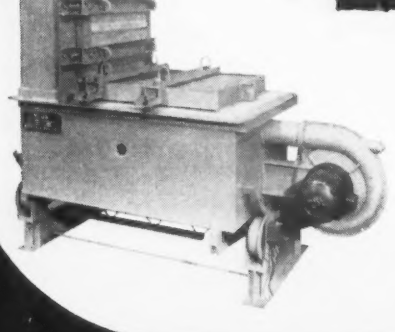
has improved overall foundry operation . . .

doing a wonderful job . . .

much more flexible . . . entirely satisfactory .

castings come cleaner . . .

sincerely recommend it . .



Reda Stack-Loading melting furnaces for ferrous and nonferrous metals have been designed and built by experienced foundrymen for foundrymen everywhere. That is why Reda furnaces provide advantages far beyond those found in other, and more expensive types; that is why, with Reda furnaces there is less down time for maintenance, longer uninterrupted melting runs, and lower melting costs.

Another feature is the Reda Burner arrangement which can operate from oil and gas simultaneously or be switched from one fuel to the other instantly. *Write or phone for complete details.*

REDA FURNACE

REDA PUMP COMPANY • BARTLESVILLE, OKLA.

give a method of calculating the optimum period of exposure for given conditions. For cast iron and steel, results are not satisfactory if the casting is less than 20 mm thick.

Impact Tests on Gray Iron Casting, by G. N. J. Gilbert, British Cast Iron Research Association. Charpy impact tests and slow bending tests were made on straight and notched test bars, and the results were compared. As the dimensions of the test bar increase, the charpy impact figure must be multipled by a coefficient ranging from the square to the cube of the increase of size. Tests made at different temperatures indicate the existence of an interval of temperature transition. The effect of notching has been studied. The author concludes that for the impact test on gray iron the charpy test appears to be the best.

The E. Dubi Hardness Characteristic Generalized, by Dr. Albert Collaud, technical director of Klus Works, Switzerland. This was the official exchange paper of the Swiss association. The paper deals with the relation between tensile strength and hardness. The E. Dubi characteristic is based on taking two test bars of different diameter from a given cast iron, taking the tensile strength and brinell hardness in each case, plotting two points in the corresponding diagram and joining these two points by a straight line. Experience shows that the values for tensile strength and hardness are functions of this straight line. This enables tensile strength to be deduced from the brinell hardness. By bringing in the law of variation of the tensile strength, if known, as a function of the cooling rate one test bar will suffice and the resulting chart permits the use of the brinell hardness for obtaining tensile strength. By ascertaining graphite content, or the degree of eutectic saturation obtained through chemical analysis, and plotting against brinell hardness, this can be used for tensile strength without necessitating a test bar.

Technical Progress and Economic Aspects of Gamma-ray Radiography, by C. G. Carlstrom, Royal Technical Institute, Stockholm. This was the official exchange paper of the Swedish association. From 1950 to 1952 researches in Sweden have been made on the use of Co_{60}, Ir_{192} and Tm_{170}. Improvements in the use of lead screens with Ir_{192} have been made, enabling examination of steel through thicknesses ranging from 30 to 50 mm. Tm_{170} has been found useful for thin walls from 0.5 to 5 mm.

owing to its low energy. Co_{60} and Ir_{192} have the advantage of relatively low cost.

Of two papers on malleable castings, one was a **Report on White Heart Malleable containing Molybdenum or Manganese and Chromium,** by Dr. Franz Roll, of Duisburg, Germany. The addition of ferromolybdenum at 60 to 65 per cent Mo gives the following results: Increase of tensile strength and elongation; completely perlitic structure; greater resistance to heat; greater resistance to wear under service conditions. Improved results are also obtained with additions of from 0.90 to 1 per cent Mn and from 0.10 to 0.20 per cent (not more) Cr.

In **Production of Iron Castings in India,** the official exchange paper of the Indian association Prakash Gupta reviews Indian malleable practice. About half a dozen foundries produce either black or white heart malleable castings, the present total rate of output being 125 tons per month.

In the nonferrous section, A. T. Pal, of Annapurna Metal Works, Calcutta, contributed a paper on **Gases in Phosphor Bronzes.** Experimental casts made under a thick layer of charcoal showed that there was no loss of tin and no vapor was formed; no addition of cupro-phosphorus as a deoxidizer was required; metallographic, hydraulic and mechanical tests showed no unfavorable effects resulting from the charcoal. The author concludes that the use of a charcoal layer gives sound castings with greater certainty than casting without cover.

Influence of Lead and Tin on the Mechanical Properties of High Duty Brass, by M. Cirou, Centre Technique des Industries de la Fonderie, Paris. A series of tests made by the author indicate that the addition of tin in high duty brass, beyond 0.5 per cent, reduces elongation, increases brinell hardness, does not much affect tensile strength; the fracture is markedly modified by a tin content of more than 1.5 per cent. The addition of lead has an unfavorable effect on all mechanical properties. The effect of simultaneous additions of tin and lead is cumulative.

Investigations on the Action of Gases on the Mechanical Properties and the Pressure Tightness of Bronzes, by Georges Blanc, director of research, Centre Technique des Industries de la Fonderie, Paris. Conclusions derived from experiments made in preparing a bronze containing 10

Simplified PIG CASTING

- Stationary wheel design eliminates 80% of moving parts
- For ferrous and nonferrous smelters and foundries

Bailey ENGINEERS

PIG CASTING MACHINE

Cold pigs as delivered from the machine.

Here is the means to increased pig casting capacity—at a considerable reduction in maintenance and operation costs. Basis of this machine's performance and service are the stationary flanged wheels over which the endless chain of moulds runs.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

Famous for Precision

SCIENTIFIC MATCH PLATES

Pressure Cast

Ask the Users!

Foundries stop shopping around for most accurate match plates after they try the SCIENTIFIC line.

Write For Bulletin.

The SCIENTIFIC CAST PRODUCTS Corp.

1390 East 40th Street
CLEVELAND 3, OHIO

2520 West Lake Street
CHICAGO 12, ILLINOIS

per cent tin are: 1) That to obtain high mechanical properties, melting must be done in an oxidizing atmosphere, or if it must be done in a reducing atmosphere the operation must be followed by an oxidizing treatment, or by a degassing treatment. Agitation of the bath also gives good results. The addition of damp charcoal, or humidity in the ladle, may considerably reduce the mechanical properties. 2) To obtain pressure tightness the design and location of heads and risers is essential, and the use of atmospheric risers is advisable.

A paper describing the **Revision of Standards for Foundry Alloys containing a Copper Base,** was contributed by Helmut Mann, of the Research Laboratory of Osnabrucker Kupfer, Germany.

Investigations on Ingot Molds were the subject of three papers. In **Contribution to the Study of Steel Ingot Molds,** Jean Durand, president of the French Technical Committee on Ingot Molds, introduced the subject, which was more fully developed in **Principal Results of the Investigation on Ingot Molds for Basic Steel,** by J. Duflot, and in **The Structure of Steel Ingot Molds,** by M. Ferry. The investigations were carried out by a joint committee of the Centre Technique des Industries de la Fonderie and of the Institute de Recherches de la Siderurgie.

A paper on light alloys was **Mechanical Properties of Two Magnesium Alloys Containing Zirconium,** by R. Pradeau, Societe le Magnesium Industriel. After reviewing, the developments of light alloys in recent years, specially in aircraft construction, the author gives comparative results of two recent types containing 0.7 per cent zirconium and 4.5 per cent zinc; one also including 1.3 per cent of other rare metals. The first gives a tensile strength ranging from 25.5 to 28 kg per sq mm, while with the other the tensile strength ranges from 20.3 to 21.2 kg, the variations in each case depending upon the method of preparing the test bar.

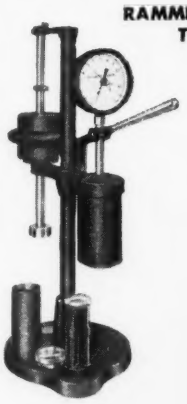
Of three papers on furnaces, one was **Construction and Operation of the Reverberatory Furnace in the United States,** by J. E. Rehder, director of technology and research, Canada Iron Foundries, Montreal. The author mentions the almost exclusive use of reverberatory furnaces in the malleable foundry, and also its use in some gray iron foundries for irons with less than 3 per cent carbon content. Information is given on the construction of reverberatory fur-

THE Short Cut TO LOW Scrap Losses

When consideration is given to the number of casting defects directly traceable to faulty sand practice, it becomes apparent that proper sand control is the short cut to low scrap losses.

The Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, permeability, bond strength, moisture, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units. Savings in scrap losses will pay for the program.



RAMMER-COMPRESSION TESTER—This simple unit combines ramming of specimens for permeability tests and making bond strength tests. Strength values are read on large dial.

PERMTESTER Permeability values for molding and core sand mixtures are shown on dial in a few minutes.

All Gordon-Campbell sand testing units are designed to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

FREE TO ANY FOUNDRY MAN

Write for this booklet. It explains foundry sand control and how to reduce scrap losses.

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors

Metallurgical Testing Machines • Industrial Furnaces & Ovens • Temperature Control Instruments • Thermocouples & Accessories

Dept. 20 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 20 • 2035 Hamilton Ave., Cleveland 14, Ohio

naces, the type of fuel used, refractories, and a discussion of the duplex melting method.

Several papers dealt with various aspects of foundry practice, including one on **Contribution to the Study of Heads and Risers—Use of Exothermic Products,** by P. Nicolas, Centre Technique des Industries de la Fonderie, Paris. The author gives a detailed explanation of a method of calculating the volume and shape of heads and risers, the law of cooling, and the best positions for given designs of casting. Reference is made to the use of exothermic constituents in cores.

Study of the Flow of Metal in Molds—Practical Application of Scientific Principles, and Results, by Charles Trenckle, of Societe Alsacienne de Constructions Metalliques, France, includes formulas and charts, covering the time required to fill a mold, the method of feeding, the reduction of the rate of flow of the metal in relation to the length and diameter of runners. The principles developed are claimed to apply to all types of metal, sand and designs of castings, but the numerical results in the paper apply only to flat castings, machine molded in synthetic sand, or by hand in natural sand.

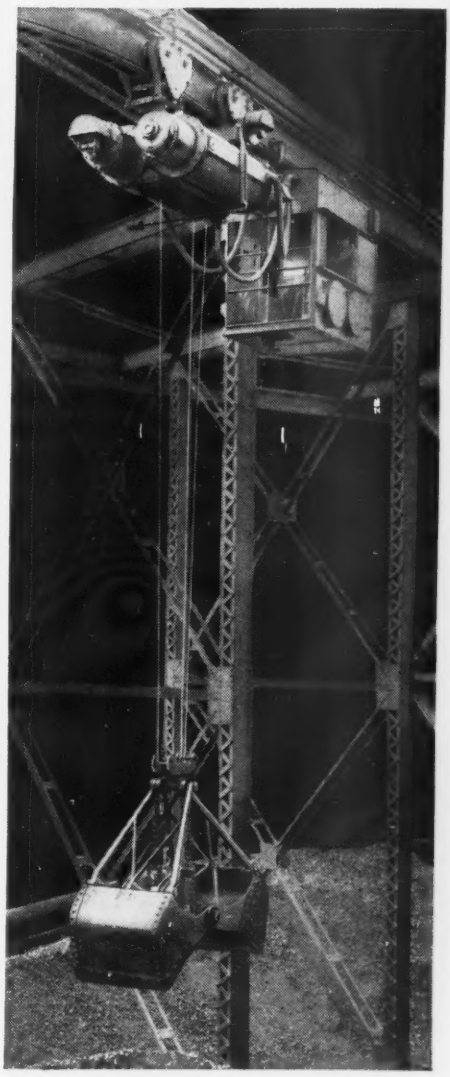
Influence of Metallurgical Factors on the Production Costs of Flat Castings in Gray Iron, by E. Doat, manager of the South-East District of Centre Technique des Industries de la Fonderie. The author claims that 50 per cent of the cost of production of thin castings in gray iron originates from the cost of metal. He therefore stresses the importance of metallurgical factors. He deals with the chemical composition of the iron that should be best suited for the given casting and the constitution of the charge. To reduce production costs he recommends the avoidance of ferroalloys and of hematite iron, to avoid excess silicon, and to watch carefully the causes of melting losses.

Recent Developments in the Norwegian Foundry Industry, by J. Sissener and T. Krogvig, official exchange paper of the Norwegian association. The authors describe three Norwegian foundries showing the tendency toward mechanization. One produces machinery castings of medium and large sizes, with use of sandslinger and mechanical devices for sand preparation, shakeout, cleaning and charging. The second foundry produces boilers on repetition lines. The third produces small castings, also by repetition but for rela-

Cut handling costs...

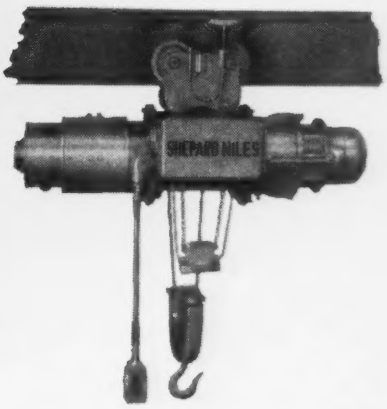
with **SHEPARD NILES**

Through-The-Air Equipment

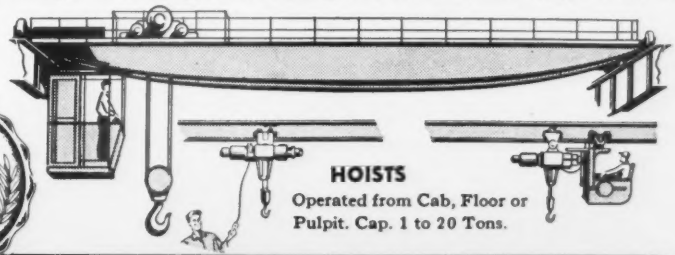


No system of handling serves your whole plant at less cost than thrifty through-the-air handling! With a Shepard Niles cab or floor operated hoist, you move heaviest loads swiftly, safely—eliminate rehandling—speed production—save manpower. At the same time, you put unused ceilings to work — make more space for machinery and storage.

Let thrifty through-the-air handling help you cut costs. Just make certain you select the right hoist! Call in the Shepard Niles representative to talk over this problem—he's a specialist in loads through-the-air. Send for Bulletin today describing Shepard Niles Monorail Hoists — and arrange to have a representative stop by.



CRANES
Overhead: Top Running, Inner Running, Under Running, Floor or Cab Operated. Cap. 1 to 450 Tons.



50th ANNIVERSARY
SHEPARD NILES CRANE & HOIST CORP.
1903-1953

HOISTS
Operated from Cab, Floor or Pulpit. Cap. 1 to 20 Tons.

SHEPARD NILES
CRANE AND HOIST CORPORATION

1330 SCHUYLER AVENUE, MONTOUR FALLS, N.Y.

WANT FASTER, SAFER, CHEAPER MATERIALS-HANDLING?

COMPACT, FAST TRAVELING

KRANE KAR

SWING-BOOM MOBILE CRANE

CAN SWING IT!

1½, 2½, 5 and 10 ton cap.

By swinging the boom over the side of gondola cars *"KRANE KAR can unload 50 to 55 tons of pig iron and malleable steel in 3 hours,"* reports a Midwestern foundry. Speeds Unloading into storage piles and bins . . . Loading of scale cars and charging buckets . . . and Handling of big castings through grinding and finishing operations.

KRANE KAR Lifts, Transports, and Spots loads of any shape or size up to 10 tons. Using hook or magnet, ***KRANE KAR*** safely and efficiently handles Patterns, Flasks, Molds, Cores, Sand Boxes, Rails, Ingots, Billets, Slabs, Scrap . . . and, with a bucket, Coke, Sand, Clay, Coal. Rubber-tired, gas-powered ***KRANE KAR*** works indoors/outdoors 24 hours a day!

Thousands of ***KRANE KARs*** serving Foundry, Iron and Steel Industry throughout the country. *Write for Bull. #89, "How to Cut Handling Costs."*

SILENT HOIST & CRANE CO., 885 63rd ST., BROOKLYN 20, N.Y.

Control Foundry Chilling with

CHILL KOOLHEAD NAILS

CHILL NAILS *and* SPIDERS

Choose any style chill nail from jumbo to stubby; slim, medium, or horse nail blade, blunt, pointed, straight or 90° bent. Same types available in Stainless, Brass, Aluminum; Copper coated to order. Spider Chills, jumbo or horse nail legs—double or single. Available in various sizes and types; also made to your individual specifications.

Write for detailed descriptions and prices.

STANDARD HORSE NAIL CORP.

Since 1872 NEW BRIGHTON PA.

Other Products

PINS Stanho KEYS

SPECIAL PARTS

tively small runs in this instance.

Other papers, not available in printed form at the time this report was prepared, included:

"Hydrogen in Cast Iron," by Professor P. Bastien, past president of the Association Technique de Fonderie. This was an official French paper, presented at the opening meeting at the Sorbonne.

"The Influence of Copper on Certain Properties of Cast Iron," by Prof. A. de Sy, University of Ghent, and J. Foulon, director of Association Technique de Fonderie de Belgique.

"The Influence of Phosphorus on the Correlation Between the Saturation Index or Carbon Equivalent and the Brinell Hardness and Other Mechanical Properties of Cast Iron," by J. Guillamon, France.

"Investigation on the Absorption of Gases during Melting in the Cupola Based on the Raw Materials in the Charge," by M. Siegel, Germany.

"Isothermic Transformations and Heat Treatment of Copper-Chromium and Nickel-Chromium Cast Irons," by J. Van Eeghem, J. Vidts and Prof. A. de Sy, Belgium.

"Remarks on Spheroidal Graphite in Cast Iron," by M. Marincek, Switzerland.

"Practical Study of the Pouring System of a Pressure Tight Casting in Nodular Iron," by M. Mortara, Italy.

"The Application of Color Metallography to the Study of Spheroidal Graphite Iron," by Messrs. Scortecci and Durand, Italy. This was the official exchange paper of the Italian Association.

"The Question of Germs (Nuclei) in Spheroidal Graphite Iron," by M. Witmoser, Germany.

"Study of the Transformation Points in Spheroidal Graphite Irons from the point of view of Annealing," by M. Pensotti.

"Test Piece to Measure the Tendency of Iron to Form Cracks, for Use in the Shop," by E. Gabel, France.

"The Modulus of Elasticity and the Structure of Cast Iron," by M. Le Rolland and Madame Plenard, a French official paper.

"Electric Heat Treating Furnaces," by M. Barbas, France.

"The Operation of the Cupola for Obtaining High Duty Cast Iron," by K. Dennery, France.

"The Use of the Industrial Frequency Induction Furnace for Preparing Cast Iron," by M. M. Tagliaferri and Barbazanzes.

"Rammed Siliceous Refractory Linings—Improvements in Ramming and Drying," by P. Blanchard, France.

"On the Selection of Refractories," by V. Bodin, France.

"On the Use of Foundry Sand Testing—Suggested Test for Mold Stripping," by F. Boussard, official exchange paper of Association Technique de Fonderie de Belgique.

"Cooling of Heads and Risers—Their Dimensions—Attempt to Verify and Apply a Theory," by M. M. Berger and Belin, France.

"Postwar Experiment on Cement Molding in a Dutch Foundry," by A. de Bruin, the Netherlands.

"Thermic Characteristics of the Cooling of Castings—Heads and Correct Length of Runners," by W. S. Pellini, U. S. A. This was the official exchange paper of the American Foundrymen's Society.

"Measuring the Hardness of Molds — Its Value in Regard to Appreciating the Degree of Ramming in a Molding Machine," by Mm. Piwowarski and Patterson, Germany.

"A Problem of Core Blowing in an Indian Foundry," by B. L. N. Rao, India.

"Principal Results of an Inquiry on Ingot Molds for French Basic Steel Practice," by J. Duflot, France.

"The Structure of Ingot Molds," by M. Ferry, France.

"Contribution to the Study of the Alloy A-Z5-G," by M. Grand, France.

"Heat Treatment of Al-Mg Alloys," by J. G. Van Ewijk, the official exchange paper of the Dutch Foundry Association.

"Arrangements Made in a Steel Foundry to Improve Hygienic Conditions of Working," by A. Huldt, Sweden.

"Dust Prevention in the Various Sections of the Foundry," by P. Nicolas, France.

"The Activities of the (French) Committee on Laboratories," by M. Ballay, past president, Association Technique de Fonderie.

"Viscosity of Liquid Metals and their Rate of Flow," by Prof. Piwowarski and M. Nacken, Germany.

"Investigation on Dust Extraction from Cupola Gases," by M. Prat, France.

"Escape of Gases from Molds and Its Measurement," by M. Roesch, official exchange paper of the German Foundry Association.

Editor's Note: For other details concerning the International Foundry Congress, see November FOUNDRY, p. 106. Photographs reproduced in that issue were by Hallery, Paris.

Aluminum Foundry

(*Continued from Page* 106)

buckles.

Soft Ram—Unless the sand is sufficiently well rammed into the mold and adequately tucked into those relatively inaccessible locations on the pattern surface, slight swellings or enlargements of the casting result (Fig. 8). This is because the sand in the affected area has been unable to resist the hydrostatic pressure of the molten metal. Close watching of the sand's moisture content will eliminate another cause of soft rams. Excessive moisture lowers flowability of the sand.

Sand Holes—These cavities in the surface of the casting, almost invariably in the drag surface, are caused by the presence of loose sand. This may arise from careless closing of the mold, faulty placement of the cores, weak or dry molding sand or soft ramming. Attention to these details will prevent such flaws.

Where the sand has fallen from the surface of the upper portion of the mold or from a core, a metal protuberance or projection will correspondingly occur above, and a cavity will appear below. Fig. 9.

Rough Sand Surface — Rapid release of dissolved gas from the casting metal as it solidifies will produce a rough sandpapery surface over the entire cope surface of a casting, intensified over heavy sections. The bubbles of escaping gas breaking against the cope surface of the mold dislodge particles of sand which are then trapped in the surface of the casting.

The corrective, of course, is to eliminate the dissolved gas, as discussed later under "Porosity."

Defects Due to Impurities—Inadvertent or accidental contamination of the casting metal may take place at any one of several stages of the casting process. This pollution frequently produces rather startling effects, but almost always the result is damaging to the strength or other properties of the casting.

Brittleness—from Dissolved Iron—For example, look at Fig. 10, which shows the result of one form of contamination. The aluminum for this casting had been melted in iron crucibles that had never been lined with a coating of refractory material. As a result, the molten aluminum had dissolved some of the iron. The casting on analysis showed a 3.5 per cent iron content, making it very brittle and difficult to machine. Moreover, the melting temperatures had been allowed to rise to very high levels, which markedly increased the dissolving action of the aluminum on the iron in the melting pot.

"Certified" Abrasives

CLEAN MORE CASTINGS PER DAY!

SPEED UP production in *in your* blast cleaning room with "Certified" Abrasives. "Certified" Samson Shot and Angular Grit are first choice in hundreds of foundries...give better, longer performance because they're made *extra-tough* by a special *automatically controlled* hardening process. Specify "Certified" and start cleaning more castings per day.

All sizes graded to S.A.E. specifications

Experienced Foundrymen say:

Always specify "Certified"

ACCEPTED AND USED FOR OVER 55 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

MEMBER FEMA

The crystallizing effect of the dissolved iron, rendering the casting extremely brittle and liable to fracture, is clearly visible in Fig. 13, where the coarse, unusually crystalline appearance of the fractured surface of the casting is shown.

It was subsequently found that a large quantity of metal had become contaminated in the same manner by the reuse of gates and risers of high iron content. All of this metal had to be scrapped.

To guard against iron pickup, therefore, it is essential that the crucible must be protected against the dissolving action of molten aluminum. This is particularly true in sand casting, where the melting temperatures are higher than in die casting.

This is just one example of the results of contamination. Accidental mixing of alloys of widely differing composition can also produce very brittle metal that is undesirable or even completely unusable.

Excess Hardness — from Inclusions of Oxides, Dross and Flux—By far the most prevalent form of contamination by nonmetallic materials is the inclusion of aluminum oxide or a mixture of aluminum and magnesium oxides. These unwanted additions are a source of weakness in the casting and also lessen its machinability because they are sufficiently hard to dull or break the edge of the hardest cutting tools.

These oxide inclusions show up on a fracture as gray or black hard particles, sometimes in powder form, in other cases as a film. At times they show up as blisters, produced by mixtures of oxides and flux. (Figs. 11 and 12.)

The main source of all oxide and dross inclusions in aluminum castings is improper pouring technique. Of the mistakes that can be made, the primary one is agitating the metal at some point during its handling between ingot and mold. It is absolutely basic, in producing high quality castings, that so far as possible all turbulence or agitation be eliminated from this stage of the process. Here are four points to watch: 1. Metal should not be stirred while in the melting furnace. 2. Transferring metal should be accomplished with as short a stream as possible between the two vessels. 3. When pouring the aluminum into sand molds, the crucible or ladle should be held as close as possible to the sprue opening. 4 The sprue should be kept full at al times to minimize turbulence, agitation and entrapping of air.

Study Gating System

The design of the runner and gating system should also be studied carefully to insure that the metal enters the mold cavity smoothly and with the least obstruction and disturbance during its flow.

If flux must be used, sufficient settling time must be allowed for the dross and excess flux to float to the surface of the metal where it can be removed. The foundryman should keep it as a general rule that flux is to be used *only* to assist in the removal of dross—he will not then be likely to allow flux to be stirred into the body of molten aluminum where it is more probable that it will find its way into the casting.

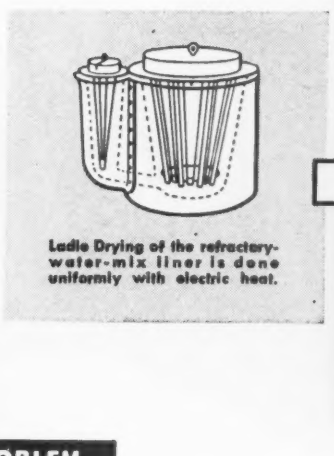
"Blows" — from Gas Pressure — These are voids or cavities which are caused by sudden locally developed gas pressure—usually steam—during pourings.

Normal or "open" blows are generally smooth-walled and rounded or globular in shape, usually open to the surface of the casting (Fig. 13).

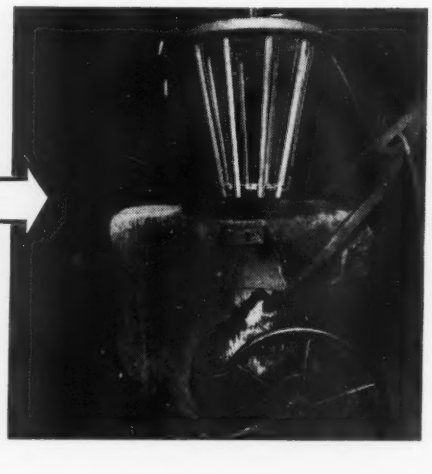
"Collapsed" blows are occasionally produced when voids formed in the same way are closed again by further movement of the molten metal. They appear as only a fine line or

Another CHROMALOX Production Tip

ELECTRIC HEAT UNIFORMLY DRIES LADLE LINERS



Ladle Drying of the refractory-water-mix liner is done uniformly with electric heat.



PROBLEM

Dry liners quickly and get ladles back into use; reduce rejects due to the uneven drying of the manually operated gasoline torch method on ladle liners; reduce the high man-hour cost of drying each of the ladle linings; make work area more comfortable.

SOLUTION

A standard, flange type Chromalox Electric Heater was mounted in a lifting lid and lowered into the ladle as heat was required. A small blower was installed to force air through ladle; another small tubular heater was installed in spout to do the same job.

ADVANTAGES

Automatic temperature controls assure even heat on all parts of the liner. Guesswork is eliminated, and exactly the right amount of heat is forced into the liner as required to dry it thoroughly. "By-product" advantages include the elimination of the hazards of open flame drying and cleaner, more comfortable working area.

CHROMALOX
Electric Heat for Modern Foundries

SEE HOW CHROMALOX ELECTRIC HEAT CAN CUT MANY FOUNDRY OPERATING COSTS.

EDWIN L. WIEGAND COMPANY SB-30
7596 Thomas Blvd., Pittsburgh 8, Pa.
Send me more details on Chromalox Electric Heat for
☐ Shell molding ☐ Core drying
☐ Skin drying of molds ☐ Comfort heating
Name
Company
Street
City Zone
State

crack on a machined surface, but a fracture through the area will usually reveal a typical structure such as that in Fig. 14, indicating its true origin as a collapsed blow.

Either kind of blow may arise from several conditions. The molten metal may strike the cold or damp surface of a chill, whereupon steam will be generated and blast a void into the solidifying metal. Moisture in the sand, and paste or wet mud in the mold, will also generate steam. Low permeability of the sand may contribute, by hampering the escape of normal amounts of steam. Excessive core gas from inadequately vented or improperly baked cores may also produce blows. Too liberal use of a swab, especially in conjunction with sand of low permeability, is another source of blows.

To avoid blows, therefore, chills should be warm, clean and dry before placing them in the mold. It may often be advisable to warm the chills with a torch, just before closing the mold and pouring. Other corrective measures can be applied.

Defects Due to Cracking — Only those cracks caused by metallurgical conditions will be discussed here. The following will not be concerned with the prevention of cracks due to mechanical damage and arising out of mishandling of the castings, since every foundryman must be aware of the best means for avoiding such troubles in his plant.

Hot Cracks or Solidification Cracking—This type of crack (Fig. 15) occurs during solidification while the temperature of the alloy is either in the solidifying range or just below the solidification point. It is caused by restraints imposed on the casting by the mold which prevent the metal from shrinking the normal amount required by thermal contraction. This may be due to hard cores or to cores of insufficient collapsibility, or to too-hard ramming.

Aluminum alloys differ markedly in their resistance to this type of cracking. Some are highly prone to it; others, notably those with high silicon content, are rarely troubled with it.

Proper gating will prevent such shrinkage cracks. Aluminum should enter the mold cavity at as many points as practical, with considerable attention being paid to the equal and uniform distribution of the metal. If the number of gates is inadequate, or if the location of gates is not the best, too much metal may flow through one gate, causing that particular area of the casting to become overheated. This area will then be the last to freeze, concentrating the contraction stresses at this point, and as a result a crack may be formed. A redesigned gating system should

★ ★ ★ This is where PATTERNS of quality and precision are produced for the automotive, aircraft and metalworking fields . . . backed by 35 years of know-how.

★ ★ ★ These superior PATTERNS are produced under the personal supervision of the two owners and a highly skilled group of employees.

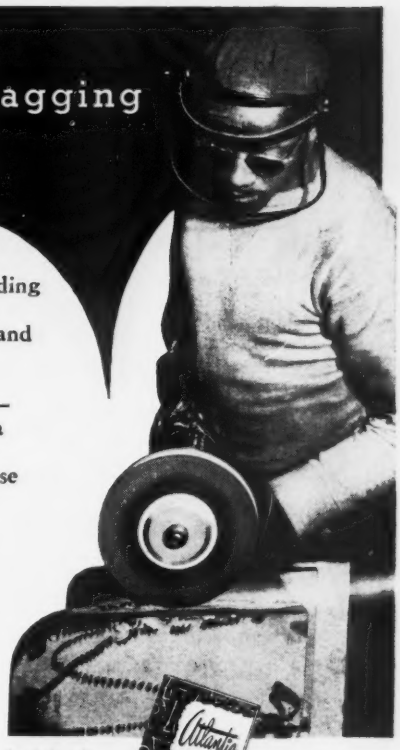
★ ★ ★ The owners are naturally proud of their reputations. That's your guarantee of quality work and reasonable prices. Let them give you a quotation on your next job—and give you a pleasant surprise.

AUTOMOTIVE PATTERN Company

Wood and Metal Patterns

18840 John R. St., Detroit, Michigan

Faster . . . Safer Snagging starts here



Faster because Atlantic Speed-Tested Grinding Wheels feature a smooth, floating action that requires less pressure, reduces fatigue and speeds up snagging from start to finish.

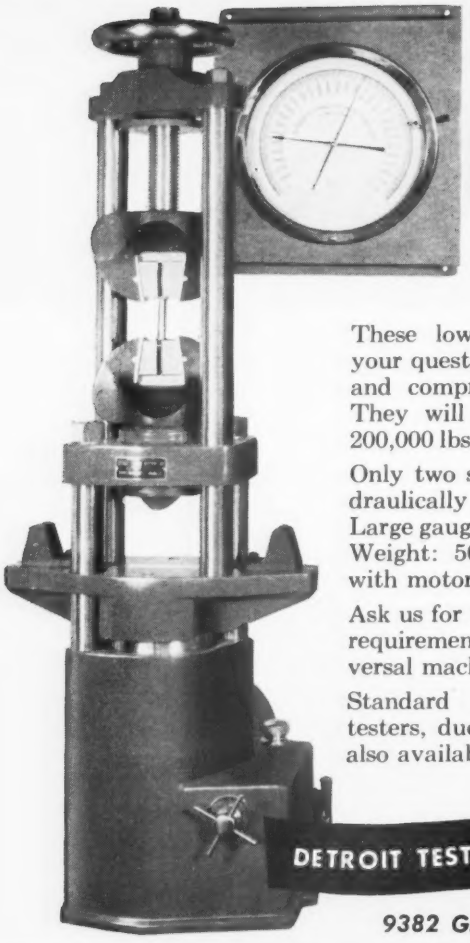
Safer because every Atlantic Wheel made — from the 2 inch size on up — is test run at a 50% higher speed than that required for normal snagging conditions . . . safer because every wheel features a special Resinoid Bond for extra strength and long life under high operating speeds.

Lower cost, too. Atlantic Grinding Wheels seldom have to be dressed . . . reduce downtime . . . help keep replacement costs at a minimum. Try them and see. Specify Atlantic Wheels next time you order.

Send for the complete, fact-packed Atlantic Grinding Wheel Catalog now. Atlantic Abrasive Corp., 567 Pearl St., South Braintree 85, Mass.

ATLANTIC ABRASIVE CORP.

South Braintree 85, Massachusetts



30,000 and 40,000 pound

Universal

Testing Machines

These low-cost machines will answer all your questions about the tensile, transverse, and compression strength of metal parts. They will apply up to the equivalent of 200,000 lbs. per sq. inch (on a .505 specimen).

Only two simple controls operate these hydraulically powered, automatic machines. Large gauge gives accurate reading instantly. Weight: 500 lbs., height: 4'-4". Equipped with motor, gauge, grips, and blocks.

Ask us for more information or send us your requirements for a quotation, as this Universal machine can be modified many ways.

Standard and special Brinnel hardness testers, ductility testers, and tensile testers also available.

DETROIT TESTING MACHINE COMPANY

9382 Grinnell Avenue, Detroit 13, Michigan

ABC

FOUNDRY COKE

Unusually Uniform in Both Chemical and Physical Analyses

Control of analyses within very narrow limits has been achieved at ABC by the proper combination of improved mechanical equipment and rigid supervision. ABC's large and modern coal preparation plants are under the direct supervision of our coke oven Laboratory.

We invite your inquiries.

ALABAMA BY-PRODUCTS CORPORATION

General Sales Office:
FIRST NATIONAL BUILDING
Birmingham, Alabama

clear up the trouble from that source.

If hot cracks in castings persist despite these corrective measures, it may be quite possible that the design of the casting is inherently unsuitable for an alloy subject to this type of cracking.

Shrink Cracks — Severe surface shrinkage may result in the visible parting of the casting surface (Fig. 18). Less severe shrinkage will produce an easily discernible depression and a sponginess in the surface. To prevent such defects, take all the usual measures to reduce shrinkage, such as the use of chills and risers, and where necessary make gating changes to improve the distribution of hot metal.

Quench Cracks — Stresses imposed on the casting by cooling of the metal during the quenching process which follows solution heat treatment produce this form of crack (Fig. 16). When these stresses exceed the tensile strength of the alloy in the local area, a fracture results.

Chief cause of such cracks is the use of cold quench water. Water for quenching should never be below 150 to 180° F. Even with boiling water, the design of the casting may be such that quenching stresses will still be sufficiently severe to crack the casting. So, to insure a minimum of quenching cracks, use boiling quench water.

Defects Due to Shrinkage — This necessarily brief discussion will be limited to a few of the most common types of shrinkage. An extensive article could be written on this subject alone, since it embraces the entire technique of gating, chilling and risering of castings.

When molten aluminum alloys solidify, the volume decreases. If this decrease in volume is not compensated for by adequate feeding, it will show up in the finished casting as finely dispersed porosity, as localized voids in the interior, or as surface holes or depressions. Such shrinkage defects may be broadly classified in three groups according to cause.

Caused by Too Few Gates—Unless the casting is very simple, the use of only one gate to feed the cavity will often result in shrinkage in the vicinity of the gate. When too much metal passes over one area in the mold, the sand becomes overheated and that area of the casting feeds last, with results like those in Fig. 17.

By using two or more gates, almost every shrinkage defect of this type can be eliminated. The use of a larger number of gates will usually also permit a lower pouring temperature which, as discussed in the next paragraph, will also help reduce shrinkage trouble and improve appearance of the casting.

Caused by Too High a Pouring Temperature—Shrinkage is often aggravated by pouring the metal at too high a temperature. In Figs. 26 and 27, the gating was probably adequate but an excessively high pouring temperature resulted in the surface shrinkage shown.

However, when it is suggested to the average foundryman that the lower his pouring temperature, he will usually reply, "But the casting won't run." The reasons why it won't run at a moderate pouring temperature can generally be traced to inadequate venting, low permeability or inadequate gating. When these factors are corrected, the casting will run properly at a lowered pouring temperature and shrinkage defects will disappear.

Caused by Inadequate Feeding — The shape, location and size of risers deserve the foundryman's careful attention no less than any other step in the preparation of the mold, for to a very large extent how well they perform their job of feeding the casting determines how good a piece will result. Small errors in any of these riser details may often produce large differences in the outcome (Figs. 20 and 21).

A common error is the providing of too small a neck connecting the riser to the main body of the casting. This neck will then freeze first, before the large mass of metal has solidified, and as a result the riser cannot feed.

Another is locating the riser too far from the section it is supposed to feed, so that the liquid feeding metal cannot reach that area and prevent shrinkage.

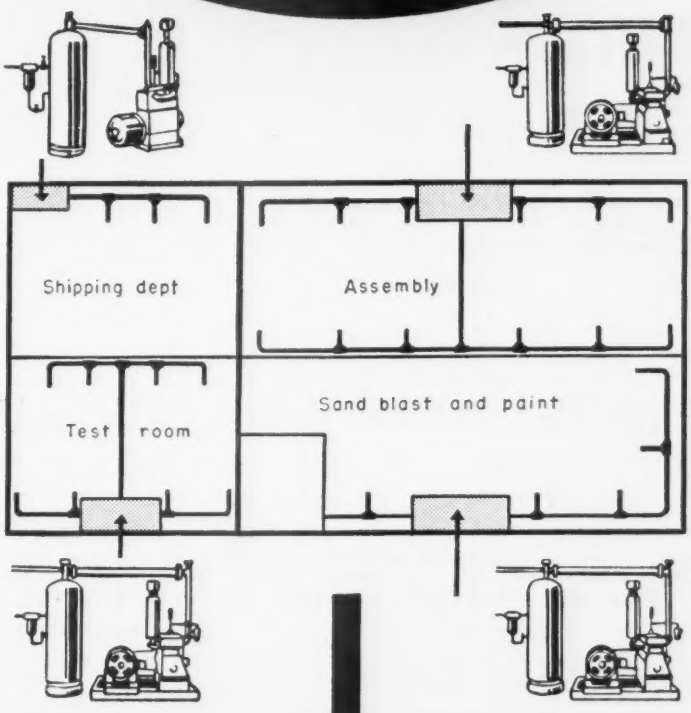
Advises Short, Broad Risers

Tall, thin risers are generally inadequate and ineffectual. In general, risers should be short, broad, and closely connected to the section they are to feed.

Improper gating can often lessen the efficiency of a riser. Since the riser, to feed properly, must remain liquid after the main body of the casting has solidified, the riser should be the last portion of the mold to be filled, so that it contains the hottest metal. Where possible, it is generally good practice to gate through a riser. Certainly it is obvious that risers which are located on the opposite side of the casting from the gates will be largely ineffectual since they will contain the coldest metal in the mold.

Chills are an effective means of combating shrinkage. They equalize the rate of solidification between a heavy section and an adjoining thin one, and thus minimize the possibility of shrinkage. They also promote directional solidification, so that a

How To SAVE MONEY



on your AIR COMPRESSOR Installation

with the SCHRAMM UNIT SYSTEM

The perfect, money-saving, "inside-the-plant" air compressor installation is the Schramm unit system . . . whereby, in a minimum of space, you install one, two, three or more Schramm air compressors, according to your air needs, and operate them separately, or as one unit, as the load requires.

1. Low in initial cost. No foundation cost, cuts by half the installation price. Can be transported into the plant on standard material handling equipment, set in place, grouted, bolted down, ready for use immediately.

2. Low in operating cost. The losses when operating a large compressor at light load are very great. On the other hand, the vertical compressors in unit system can be equipped with automatic start and stop control, set at proper pressure ranges, so as to regulate the air output according to load demand. Unit system installations allow you to use one, or as many of the compressors as you need.

SCHRAMM INC.

The Compressor People

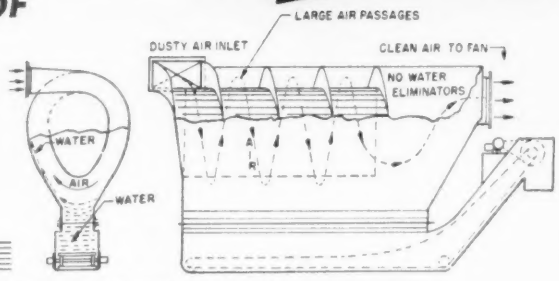
WEST CHESTER PENNSYLVANIA

THE MASTER OF

DUST

IN INDUSTRY

Air Tumbler



CONSTANT CAPACITY and sustained **HIGH EFFICIENCY** with a minimum of maintenance are among the most important characteristics of the **AIR TUMBLER.** They result from its simplicity of design and operation, which dispenses with sprays, pumps, water eliminators, rotating elements, and similar devices.
The **AIR TUMBLER** in a short time has found its way into every kind of industry in this country and abroad, and has become standard equipment wherever tried.

For further information write to:

DUST SUPPRESSION AND ENGINEERING COMPANY

P. O. Box 67 Lake Orion, Michigan

Or to any of the following licensees:

AUSTRALIA
Air-Dust Separators Co.
15 O'Connell St.,
Sydney

CANADA
Kipp Kelly Limited
68 Higgins Ave.,
Winnipeg

BRAZIL
Gema S.A.
Caixa Postal 4963,
Sao Paulo

ITALY
Aerotecnica Marelli
Casella Postale 1217, Milano C.

SWITZERLAND
Machines Electriques S.A.
59 Rue du Rhone, Geneve

HOW TO STOP SLAG-HOLE FAILURES

Operators of continuous pour cupolas report CARBOFRAX silicon carbide blocks retain correct hole size, even through long runs. They are completely dependable—your best way to avoid costly slag hole failures. One trial order will show why. For further data, write Dept. V-123, Refractories Division, The Carborundum Company, Perth Amboy, N. J.

Use slag-hole blocks by

CARBORUNDUM

Trade Mark

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Co.

riser can feed effectively. Where an exceptionally heavy section of a casting must be fed, but under normal cooling conditions the metal will not solidify quickly and in the direction of the riser, chills placed on the heavy section of the casting will promote directional solidification *toward* the riser and reduce the likelihood of shrinkage.

Insulating riser sleeves and exothermic riser compounds will effectively improve the feeding characteristics of risers. With their aid, smaller risers can be used without lessening the adequacy of the feed or increasing the chance of shrinkage.

Defects Due to Porosity—Porosity is never apparent on the surface of the casting when it is removed from the sand; it shows up only after the casting has been grit-blasted or wire-brushed or given any other surface treatment, or after it has been sawed or machined.

There are several causes of internal porosity. One of these is well dispersed shrinkage, for which we will not attempt to prescribe a specific preventive measure. The cure lies in a general tightening up of foundry practices, and closer attention to pouring temperatures and correct mold preparation. The other types of porosity are generally the result of trapped or dissolved gas or generated steam.

Dissolved Gas (Hydrogen).—It is generally agreed that the primary source of internal porosity in aluminum alloy castings is hydrogen gas released from gas dissolved in the aluminum alloys. This hydrogen is picked up originally by the metal as the result of the reaction between the aluminum and any form of moisture, or between aluminum and some hydrocarbons.

Moisture reacts with aluminum to produce aluminum oxide and hydrogen gas, which then dissolves in the aluminum. Unburned hydrocarbons in the combustion gases of oil-fired or gas-fired melting furnaces will also react with the aluminum to produce hydrogen.

The degree of solubility of hydrogen in aluminum increases rapidly as the temperature of the molten metal rises. Conversely, as the metal cools, it can hold less hydrogen. Thus, when aluminum containing a fairly large amount of dissolved hydrogen is poured into the mold and solidifies, the gas comes out of solution and, if it cannot escape to the atmosphere, will cause the formation of tiny pinhole voids such as those shown in Figs. 22, 23 and 24.

Porosity resulting from dissolved hydrogen gas is generally found fairly uniformly distributed throughout the casting—in both thick and thin sec-

tions. The pinholes are usually well defined and are more or less rounded voids, but their shape may not always be truly spherical since it is often affected by the alloy, the pouring temperature, and the degree of gassing.

Examination of a small area or a few pinholes cannot with certainty determine whether the porosity is due to gas or to shrinkage. If the porosity is localized in a relatively small area, it is probably due to shrinkage; if it is generally distributed throughout the casting, then it is more likely due to dissolved gas.

In taking steps to eliminate porosity due to dissolved gas, one of the first measures is to scrutinize melting and pouring temperatures. One of the most common sources of gassed aluminum is overheating the metal during melting and then pouring at too high a temperature. As mentioned above, the amount of hydrogen that may be dissolved increases rapidly as the temperature of the metal is raised. If the aluminum that has been overheated is allowed to cool slowly down to a low pouring temperature, much if not all of the dissolved gas will be released from the metal and sound castings will often result. However, this method is not wholly reliable and quite often the castings still will be porous.

Must Have Complete Combustion

Another corrective measure is to lessen the likelihood of hydrogen being formed—by reducing the chance of exposing the aluminum to a hydrogen-forming atmosphere. Here the character of the combustion gases in the melting furnace becomes important. If there is insufficient air for complete combustion, the presence of unburned hydrocarbons will make the combustion gases reducing in nature and a source of hydrogen which will then become dissolved in the molten aluminum. To minimize hydrogen-porosity, combustion gases should be neutral or slightly oxidizing.

Humidity of the air used for combustion should also be kept as low as possible. High humidity air becomes even more undesirable when the metal is overheated. Damp tools, damp flux, or charging with damp or corroded metal—all sources of moisture that may generate hydrogen—should be watched for and corrected when seeking to eliminate pinhole porosity due to hydrogen.

Dissolved hydrogen can be removed from molten aluminum by several methods. The most common of these is bubbling a gas such as nitrogen or chlorine—which will combine with the hydrogen—through the metal for a period lasting about five

"FALLS BRAND" ALLOYS
AMERICA'S LARGEST PRODUCERS OF ALLOYS

"FALLS"

COPPER SHOT

for Addition to Cast Iron

Promotes the following properties:

Increased tensile strength, transverse strength and Brinell hardness.

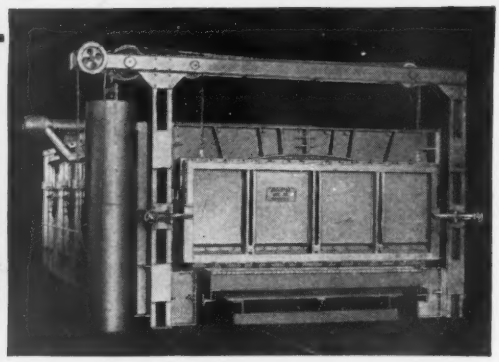
Increased wear resistance—Increased resistance to heat and corrosion.

Increased fluidity and sharper castings.

Write for complete details

NIAGARA FALLS
Smelting & Refining Division
Continental Copper & Steel Industries, Inc.
BUFFALO 23, NEW YORK

FOR NORMALIZING ANNEALING AND ALL HEAT TREATMENT OF CASTINGS



JOHNSTON CAR BOTTOM FURNACES

You'll get clean heating, high efficiency, and fuel economy in the Johnston furnaces. Engineering experience is also apparent in their smooth mechanical operation—in their roller bearings in car and door hoist shafts, and power operated car pullers. Write today for bulletin F-240.

JOHNSTON EQUIPMENT FOR THE FOUNDRY
• MELTING FURNACES • HEATING TORCHES • LADLE HEATERS
• HEAT TREATING FURNACES • BURNERS, BLOWERS, CONTROLLERS
OVER THIRTY YEARS EXPERIENCE IN DESIGN AND MANUFACTURE.

SAFETY THE JOHNSTON LINE DEPENDABILITY
JOHNSTON MANUFACTURING CO.
2825 EAST HENNEPIN AVE.
MINNEAPOLIS 13, MINN.
ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

SEMET-SOLVAY FOUNDRY COKE

CONTROLLED—SEMET-SOLVAY'S coke plants are equipped for quality production. Guesswork is eliminated, resulting in constant uniformity in the finished product. That is why, day in and day out, our foundry coke comes up to specifications—the specifications you have demanded.

SEMET-SOLVAY DIVISION
Allied Chemical & Dye Corporation
CINCINNATI • DETROIT
BUFFALO • CLEVELAND
In Canada: SEMET-SOLVAY COMPANY, LTD., TORONTO

for Better Melting

minutes per 100 lb of metal. The added gas should be dry, and be pumped by oil pressure. Chlorine bubbled through molten aluminum is the most effective means but it is not in common use because it entails the handling of unpleasant fumes which corrode iron and steel equipment. Dry fluxes which generate hydrogen-trapping gas when plunged beneath the surface of the molten aluminum are also used sometimes (they must be dry or their effect will be nullified by the moisture introduced into the metal along with them) but these are not considered to be as effective as the use of nitrogen.

Steam Generated in Pouring—Excessive moisture in the mold will turn to steam as the hot metal strikes the sand. Two different types of porosity may result from this cause. One, which is concentrated immediately beneath the surface of the casting, is generally termed "reaction" porosity (Fig. 25). It is almost invariably found on all surfaces of the casting—cope, drag and sides—and appears to be caused by a definite reaction between the metal and the moisture in the sand, forming small voids.

Occurs Beneath Cope Surface

The other type is caused by steam bubbling up through the molten metal and can be designated as "steam" porosity. It is invariably found only beneath the cope surface of the casting and not on the drag or bottom surface. Two examples of this are shown in Figs. 26 and 27. In both, the metal immediately adjacent to the porosity is sound, indicating that there was a minimum of reaction between the steam and the body of the metal.

Excessive use of a swab around the edges of the mold cavity can often result in porosity like that in Fig. 27.

Trapped Gas and Air—This is one of the most prevalent problems in aluminum foundry work. This type of porosity shows up in the form of irregularly shaped voids—sometimes rounded, sometimes uneven—which may be clean or may be associated with dross. It appears only on the cope surface of the casting or on the upper surface of an internal portion of the piece (Figs. 28 and 29).

By and large, the air which is trapped or entrained in the metal to cause this form of porosity is picked up during and because of agitation in the flowing metal. Probably the major portion of this occurs in the sprue, and the rest may occur in the gating system or as the metal flows over or through irregularities within the mold cavity.

The corrective lies in closer atten-

tion to proper pouring procedure—one of the most neglected phases of aluminum foundry practice. Aluminum foundrymen will carefully check and control every other step in the casting process, but will allow the metal to be poured unsupervised and in a haphazard way.

Because of the low density of aluminum as compared to brass or bronze, bubbles of air and associated dross which get into the moving metal stream are not easily broken up and forced out, and are readily carried along into the casting and there rise to the surface to produce the defects illustrated.

The cure, therefore, lies in keeping air from getting into the molten metal. It is essential that the sprue be kept full of metal from the beginning of the pour to the end. The crucible or ladle should be held within an inch or two of the top of the sprue so that the chance of air being trapped in the stream is eliminated.

If pouring is done correctly, the oxide skin on the surface of the metal in the ladle will be continuous with that on the stream and on the surface of the full sprue, and at the same time stationary. The liquid metal will then move beneath it. When this condition is maintained, it will be impossible for air to get into the metal stream at the pouring point.

Similarly, the gating system should be designed so that the metal flows smoothly without turning sharp corners or tumbling over irregularities, entering the mold cavity without splashing. At times, a gate may be located at a high point on a casting and the metal allowed to fall several inches or even as much as a foot within the mold. Splashing and tumbling that would result here during pouring can easily lead to the trapping of enough air to cause porosity.

Strict adherence to the good practices illustrated in the American Foundryman's Society motion picture, "Fluid Flow In Transparent Molds," will do a great deal to eliminate defects due to incorrect pouring and gating techniques.

Editors' Note: Photographs used in Figs. 1, 6, 7, 8, 9, 13, 14, 15, 19, 21, 22 and 25 are reproduced through the courtesy of Aluminum Co. of America.

Observes Sesquicentennial

Mackintosh-Hemphill Co., Pittsburgh, which includes among its products cast iron and steel rolls for rolling mills, observes its 150th anniversary this year. Its history goes back to the forming of Pittsburgh Foundry in 1803. Many different corporate and partnership names with mergers and expansions appear in the 150-year record.

Cooper Alloy scores a "FIRST" with

SCHENECTADY

SHELL MOLD RESINS

First shell cast stainless steel valves

Mr. Morton Katz, Shell Mold Engineer, The Cooper Alloy Foundry Co., Hillside, New Jersey, reports:

"Schenectady Resins helped us to solve a perplexing shell mold problem—one that cost us many rejected shells. In the production of a particular part, we encountered serious "peeling" trouble. Schenectady Resin's SP-7452 Shell Mold Resin eliminated this problem by what appears to be the proper blend of viscosity and flow.

"SP-7452 is used extensively in our shell molding operations because of its superior strength, hot rigidity, excellent "pouring" or high temperature strength, and its adaptability for use in all of our shell molding operations."

GET THE FACTS ON SCHENECTADY SHELL MOLD RESINS

Our new Catalog gives full technical information on shell molding processes, selection of resins, etc. Mail the coupon for your copy today.

SCHENECTADY RESINS

Div. of Schenectady Varnish Company, Inc., 200 Congress Street, Schenectady 1, N. Y.

☐ Please send me your new Shell Molding Catalog.

☐ Please have one of your representatives call.

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

TRADE PUBLICATIONS

For More Details Use Reply Card—Page 233

SHELL MOLDING: Shallway Corp., 677 South Fourth St., Connellsville, Pa., and Shalco Engineering Corp., 81 Encina Ave., Palo Alto, Calif.—Operation, features and specifications of a shell mold machine are explained and illustrated in bulletin 539-5. Typical castings produced from molds made on the unit are shown and various other materials of interest are included.
For More Details Circle No. 101—Page 233

BELT LACING: Flexible Steel Lacing Co., Chicago 44—Bulletin A-61 offers information about steel, stainless steel and other noncorrosive and nonmagnetic and antisparking metal belt lacing for conveyor and transmission belting. Applications data and other material are included.
For More Details Circle No. 102—Page 233

CUPOLA EMISSION: Grindle Corp., 16231 Turner Ave., Markham, Ill.—Booklet reprints talk entitled "The Cupola Emission Problem and Its Solution" which was presented to the semiannual meeting of the East Central Section, Air Pollution Control Association, at Harrisburg, Pa., Sept. 25, 1953, by Aubrey Grindle, president, Grindle Corp.
For More Details Circle No. 103—Page 233

CONTROL VALVES: C. B. Hunt & Son Inc., Salem, O.—Catalog 531 describes air and hydraulic control valves, valve couplings and similar equipment. It shows sectional views of body, plunger, packing and interior operation and lists sizes, actions, permissible pressures and temperatures.
For More Details Circle No. 104—Page 233

GRATING SPECTROGRAPHS: Jarren-Asn Co., 26 Farwell St., Newtonville, Mass.—Catalog G2-53 offers technical information on the organization's line of grating spectrographs, including accessory and complementary equipment and instruments. Spectrographic laboratory layouts are suggested, also.
For More Details Circle No. 105—Page 233

CRANE SCALES: Baldwin-Lima-Hamilton Corp., Philadelphia 42—Bulletin 4105 explains operation, installation and applications of crane scales and indicating or recording instruments for weighing loads electronically, utilizing the principles of the firm's bonded resistance wire strain gage.
For More Details Circle No. 106—Page 233

BLAST CLEANING: Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Md.—Vol. 9 No. 1 of *Pangborn Blast Cleaning and Dust Control News* features an article on the Ford Cleveland Foundry and also contains other material pertaining to mechanized handling and blast cleaning.
For More Details Circle No. 107—Page 233

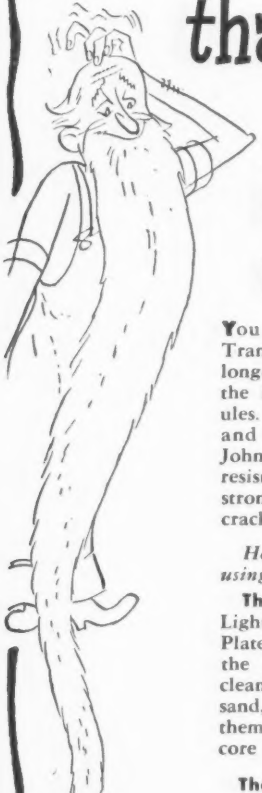
MAGNESIUM: Brooks & Perkins Inc., 1950 Fort St., Detroit 16—Folder describes plate and sheet magnesium in terms of dimensions and tolerances of different grades and devotes one page to a comparison of gages required for equal stiffness in sheet magnesium, aluminum, brass and steel.
For More Details Circle No. 108—Page 233

PRODUCT RESEARCH: Arthur D. Little Inc., 30 Memorial Drive, Cambridge 42, Mass.—Bulletin A deals with the development of new products, with improvement of established products or the methods by which they are produced and with new uses or better raw materials for established products.
For More Details Circle No. 109—Page 233

LIFT TRUCK OPERATION: Hyster Co., 2902 Northeast Clackamas St., Portland, Ore.—Fifth edition of "How to Operate a Lift Truck" is slanted for both the beginner and the experienced operator. It can be studied individually by the operator himself or be used as a guide by instructors.
For More Details Circle No. 110—Page 233

METALLIZING: Protective Coatings Division, Metalweld Inc., Scotts Lane & Abbotsford Ave., Philadelphia—Folder contains various type

Looking for core plates that LAST LONGER?



. . . then use TRANSITE CORE PLATES that stay on the job year in, year out

You can rely on durable Transite* Core Plates to give long-term service, even under the heaviest foundry schedules. Made of fibrous asbestos and cement, by a special Johns-Manville process, they resist shock and corrosion, are strong and durable, will not crack or break easily.

Here are more reasons for using Transite Core Plates:

They speed production—Light-weight Transite Core Plates are easier to handle on the job. They're easier to clean, too . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

They maintain accuracy—Years of foundry service, plus exhaustive tests, have proven that Transite Core Plates do not warp readily . . . can be used for precision core making indefinitely.

For core plates of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 60, New York 16, N.Y.

JOHNS-MANVILLE JM PRODUCTS

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

of information pertaining to metallizing, its applications and benefits. Included are data on a new spraying technique said to save considerable time and to permit work on jobs that could not be done before.
For More Details Circle No. 111—Page 233

CAST ELEVATOR BUCKETS: Link-Belt Co., 307 North Michigan Ave., Chicago 1 — Fifty - five standard sizes of cast elevator buckets are listed, with tables of dimensions, weights and capacities, in book 2465. Detailed information is provided on the mounting of buckets on belts and chains, with tables and diagrams on bucket punching. Various chain attachments and elevator bolts are illustrated.

For More Details Circle No. 112—Page 233

HANDLING PRODUCTS: Elizabeth Iron Works Inc., Box 360, Elizabeth, N. J.—Brochure devoted to all-steel materials handling products is divided into three sections. First shows ramps, second contains instructions for determining the span of gap and height differential between car floor and top of platform, and third illustrates pallet stackers of various types.
For More Details Circle No. 113—Page 233

INDUSTRIAL FLOORING: Flash-Stone Co., 3723 Pulaski Ave., Philadelphia 40—Illustrated booklet entitled "Plastic Pellets" explains the advantages of plastic pellets used in two types of industrial flooring materials and describes the characteristics of each type.
For More Details Circle No. 114—Page 233

FILTERS: Dollinger Corp., 11 Centre Park, Rochester 3, N. Y.—Bulletin 600 contains specifications and engineering and performance data covering dry type ventilation and air conditioning panel filters recommended for the removal of airborne impurities.
For More Details Circle No. 115—Page 233

DUST COLLECTORS: Torit Mfg. Co., 301 Walnut St., St. Paul 2—Catalog describes the company's complete line of dust collectors, including both cabinet and cyclone types. Illustrations, sketches, specifications charts and advice about selection of units are included.
For More Details Circle No. 116—Page 233

INVESTMENT CASTING: Precision Castparts Corp., 8705 Southeast Thirteenth Ave., Portland 2, Ore.—Brochure outlines and illustrates the precision investment casting process, with emphasis on size, metal, design, shape, tolerance, finish, quantities and cost, including die costs.
For More Details Circle No. 117—Page 233

METAL SURFACE TREATMENT: Buffalo Electro-Chemical Co., Station

finer SANDS

. . . for precision castings

- Wedron can give you fine grain, carefully screened sand for new developments in shell mold casting. Rounded grain sand particularly suitable for use in core blowing machines. Greatly reduces cutting out of core boxes.
- Also special ground sand (flour) for use with lost-wax casting method.

Rigid control of screening assures sands to meet every casting need.

MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT

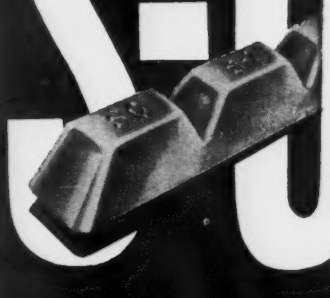
WEDRON SILICA COMPANY

38 SOUTH DEARBORN STREET, CHICAGO 3, ILLINOIS

When You Think of *Aluminum Ingot* THINK of S-G

The sign, S-G, on aluminum ingot means aluminum of uniform quality made to meet the most rigid chemical and physical specifications. Whether it's for permanent mold, sand or die cast you can be sure with S-G ingot.

Our complete modern research and testing laboratories are available to help you secure just the right ingot to meet your needs.

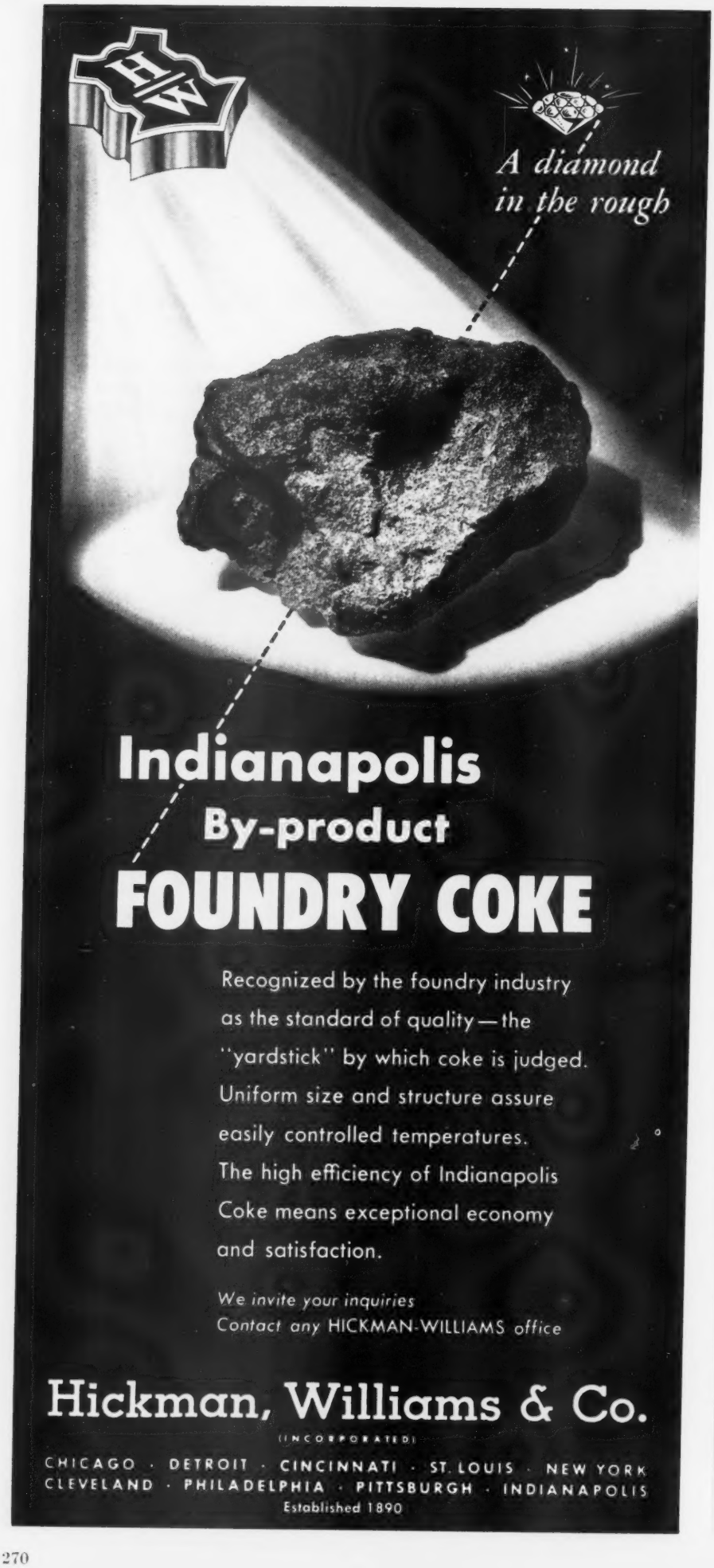


BRASS AND BRONZE INGOT ALSO PRODUCED TO YOUR SPECIFICATIONS

SONKEN-GALAMBA Corporation

MEMBER ALUMINUM RESEARCH INSTITUTE

Riverview at 2nd Street • Kansas City 18, Kansas


A diamond in the rough
Indianapolis
By-product
FOUNDRY COKE
Recognized by the foundry industry as the standard of quality—the "yardstick" by which coke is judged. Uniform size and structure assure easily controlled temperatures. The high efficiency of Indianapolis Coke means exceptional economy and satisfaction.
We invite your inquiries
Contact any HICKMAN-WILLIAMS office
Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS
Established 1890

B, Buffalo 7—Bulletin 51 explain new and improved methods of trea ing metal surfaces with peroxyge compounds. This publication is base on research and development ac complished since the company's bul letin 39, on the same subject, ap peared last year.

For More Details Circle No. 118—Page 233

AIR HOSE: Quaker Rubber Corp Division of H. K. Porter Co., Tacon & Comly Sts., Philadelphia 24—Bul letin describes uses for air hose an includes cross section and cutaway photos, performance data and tech nical information. Types of coupling suited for specific hose are covere also.

For More Details Circle No. 119—Page 233

ENGINEERING TOPICS: Fische & Associates, 5209 Euclid Ave Cleveland 3—First issue of the com pany's new monthly magazine, *Th Open Door,* contains articles on eng neering topics of interest to bot engineers and management exec tives.

For More Details Circle No. 120—Page 233

CRANE TRUCK: Elwell-Parke Electric Co., 4205 St. Clair Ave Cleveland 3—Folder gives detai about an electric-powered, two-whe drive crane truck. Space is devot to engineering drawings with d tailed specifications and to operati and construction features.

For More Details Circle No. 121—Page 233

CONVEYORS: Barber-Greene C Aurora, Ill.—Catalog 76A is devot to the company's complete line standardized belt conveyors. Ea component and accessory is illus trated and de scribed with line drawings show ing the relation ship of the unit to the entire conveyor. In additio the range of application of each u is tabulated for quick reference.

For More Details Circle No. 122—Page 233

SILICA BRICK: Harbison-Walk Refractories Co., Pittsburgh 22— lustrated booklet describes the m ture, development and performance the company's superduty silica r fractory brick.

For More Details Circle No. 123—Page 233

BERYLLIUM COPPER: Beryllium Corp., Reading, Pa.—Booklet entit "Applications Unlimited" employs tual uses to illustrate ways in wh beryllium copper can help engine solve design problems.

For More Details Circle No. 124—Page 233

GEAR METAL: Meehanite Me Corp., 714 North Ave., New Roche N. Y.—Bulletin 42 describes and lustrates many gear applications the firm's alloy and goes into de on the subject of gear casting desi

For More Details Circle No. 125—Page 233

COMPRESSOR LUBRICATI Cities Service Oil Co., New York —Third edition of booklet enti "Air Compressor Lubrication" sh

how lubricants affect compressor operation and how to benefit most from their use. Information also is given about the grades and types required for maximum efficiency in specific circumstances.
For More Details Circle No. 126—Page 233

GAS ANALYSIS: Burrell Corp., 2223 Fifth Ave., Pittsburgh 19—Catalog 81 lists and describes equipment and accessories for gas analysts. Replacing catalog 80, it outlines methods in brief, lists many different models and types of apparatus and offers aid in their selection.
For More Details Circle No. 127—Page 233

FLAME FAILURES: Combustion Control Corp., Dept. NB-8, 718 Beacon St., Boston 15—Bulletin CP21 warns in nontechnical language about the explosion danger inherent in fuel burning equipment and discusses the protection now available.
For More Details Circle No. 128—Page 233

SAND CONDITIONER: The Moulders' Friend, Dallas City, Ill.—Booklet describes and illustrates a self-propelled sand conditioner that is said to enable one man to wet down and condition all the heaps in a foundry of average size.
For More Details Circle No. 129—Page 233

ELECTRIC EQUIPMENT: Blue M Electric Co., 306-308 West 69th St., Chicago 21—Catalog covers electric ovens, furnaces, glass annealing ovens, utility water baths, humidity cabinet and incubators used in many fields, including the metallurgical.
For More Details Circle No. 130—Page 233

ELECTROMAGNET: Dings Magnetic Separator Co., 4740 West McGeogh Ave., Milwaukee 14—Bulletin B-1802A describes applications and advantages of electromagnet for holding castings during swing grinding.
For More Details Circle No. 131—Page 233

AUTOMATIC LUBRICATION: Alemite Division, Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14—Form 22-225 illustrates how to achieve automatic lubrication of entire conveyor lines without stopping the lines, thus eliminating shutdowns.
For More Details Circle No. 132—Page 233

FLOOR REPAIRS: Stonhard Co., Dept. SF, 1306 Spring Garden St., Philadelphia 23—Folder describes a floor repair material that is used to eliminate holes and ruts in factory floors and in driveways without delaying traffic.
For More Details Circle No. 133—Page 233

AIR COMPRESSORS: Davey Compressor Co., Kent, O.—Bulletin E-247 covers the organization's complete line of portable air compressors and includes photos and brief specifications.
For More Details Circle No. 134—Page 233

POURING TIME CHART: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Chart for gray iron foundrymen shows pouring time for gray iron castings in relation to casting weight and metal thickness.
For More Details Circle No. 135—Page 233

Weld steel castings with little or no pre-heat!

Match analysis! Save on cost of electrodes!

Do all three with these 7 P&H LOW HYDROGEN ELECTRODES

1. **70LB (E7016)** — Matches properties of Grade B and castings of similar analysis after heat treatment.
2. **P&H .25C (E7016)** — For castings repair where carbon is preferred to alloys for raising tensile strength. Lets you match both chemical analysis and heat-treating properties, a condition possible only with low-hydrogen coating.
3. **75LP (E8016)** — For 2% to 3% nickel steel castings. Charpy impact values of 20-35 ft. lbs. at −175° F.
4. **P&H .40C (E9015)** — For .40 carbon castings where you want to match both chemical and mechanical properties.
5. **AW2B (E9016)** — For repair welding of cast armor, "off analysis" and high-sulfur steels.
6. **P&H # 7 (E9016)** — Matches properties of Grade C and castings of similar analysis after heat treatment.
7. **90LH-2 (E10016)** — For high-tensile castings and alloy steels, such as SAE 8630, 4130, and comparable types, where the weld metal must match the heat-treating properties of the parent metal.

Get all the story on P&H Low-Hydrogen Electrodes. Write for Bulletin R-26.

P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4405 WEST NATIONAL AVENUE • MILWAUKEE 46, WIS.

the P&H *Line*

TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

2504

now! stop stoppage

in bins and hoppers with

. . . the only device that feeds stubborn materials uniformly and noiselessly from bins and hoppers by

positive displacement

PneuBin is a new but proven solution to the common, costly bin-flow problem. Neoprene panels, pulsating inside the bin walls, will feed the most difficult materials . . . from soap to salt, cork to coal, coarse lumps to micron fineness.

PneuBin moves the contents, not the bin . . . prevents arching and funneling, eliminates noise, saves bin repairs, permits closed tops. PneuBin succeeds where other devices fail.

Write for "Flow Stoppage Report" form . . . no obligation.

PneuBin is a product of **GEROTOR MAY CORPORATION**, Baltimore 3, Maryland . . . manufacturers of

GEROTOR hydraulic pumps and motors

TAILOR-MADE CORE WIRE

Cut, Straightened and Packaged

TO YOUR SPECIFICATION

VIKING STEEL **can furnish soft black annealed wire 5 ga. thru 16 ga. in straightened and cut lengths, individually bundled by weight or pieces.**

In addition to the above, *VIKING* regularly stocks the following hot rolled foundry requirements:

- Soft black annealed wire in coils
- Hot rolled rounds in coils 1/4", 5/16", and 3/8" diameter
- Hot rolled rounds—straight lengths 1/4" diameter thru 2" diameter
- Tapping bars 1/2" diameter thru 2½" dia.
- Alloy abrasion-resistant wear plates
- Wire rope—choker slings.

VIKING STEEL COMPANY

16700 St. Clair Avenue
CLEVELAND 10, OHIO

insulated against high HEAT

. . . that's Dandux INSULEX!

For hot materials in excess of 300° F . . . whether elevating or conveying . . . Dandux belting meets the requirement.

Not only is Dandux built to take the temperatures, it takes a lot more of the abrasion and wear in this type of handling.

Fasteners won't let go in a Dandux hot belt; high quality duck and rugged heat resistant compounding form a permanent bond that makes this possible.

Unusual lubricity enables the belt to round the pulley without strain or undue stretching, thus contributing to long life and low maintenance.

INNER-SEWED **DANDUX BELTING** LOCK-STITCHED

C. R. DANIELS, INC., Belting Div.

CHICAGO 6, ILL. — 549 W. Randolph St.
BALTIMORE 16, MD. — 4900 Wetheredsville Rd.
Offices in Principal Cities

THEY STAND THE HEAT!

Acme

MELTING POTS

DIE CAST POTS

INGOT MOLDS

. . . FOR MELTING NONFERROUS METALS

MADE OF SPECIAL M-HEAT RESISTING IRON

WRITE FOR SCHEDULE OF 40 SIZES

Acme FOUNDRY COMPANY

2502 22nd St. Phone: Tashmoo 5-2404 Detroit 16, Mich.

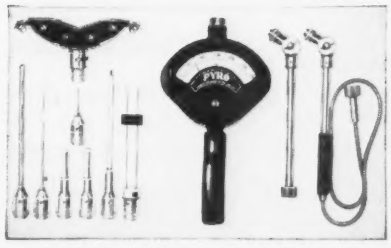
Measure Foundry Temperatures Accurately . . . at a glance!

Use the Simplified PYRO Optical Pyrometer

Any operator can quickly determine temperatures of minute spots, fast-moving objects and smallest streams with the simplified PYRO Optical Pyrometer. Completely self-contained—no calibration charts or accessories needed. An accurate, DIRECT-READING instrument that will pay for itself many times over by helping prevent spoilage. Weighs just 3 lbs. Available in 5 ranges (1400° to 7500° F.) *Write for FREE CATALOG #85, today!*

The Improved PYRO SURFACE PYROMETER

Handles all surface and subsurface temperature measuring jobs. Has selection of 8 types of thermocouples; all interchangeable in seconds with no recalibration or adjustment. Automatic cold end compensator. Shock, moisture and dust proof. Accurate, big 4¾" indicator. Available in 5 temperature ranges from 0-300° to 0-1200° F. Ask for FREE Catalog #168.



THE PYROMETER INSTRUMENT COMPANY

New Plant and Laboratory

Bergenfield 6, New Jersey

Manufacturers of Pyro Optical, Radiation Immersion and Surface Pyrometers for over 25 years.

DEVIL'S PUTTY

FOR CLEANER CASTINGS

DEVIL'S PUTTY . . . a new graphite impregnated plastic refractory for: steel and gray iron ladle linings; making up spouts and runners; linings for ferrous and nonferrous metal melting furnaces and similar applications.

DEVIL'S PUTTY reduces refractory inclusions, thus producing cleaner castings; withstands severe thermal shock without "sluffing off"; contains chemically treated graphite that will not burn out of the mix, which adds surface lubrication and permits cleaner and faster pours. Molten metal has no sticking tendency to DEVIL'S PUTTY lining, so, slag rises quickly to top for easy skimming.

BOTFIELD

Write for useful literature . . . and the name of your nearest Botfield Distributor

REFRACTORIES CO.

779 S. Swanson St., Philadelphia 47, Pa.

In Canada

Canadian Botfield Refractories Co., Ltd., 171 Eastern Ave., Toronto

Murphy Pistol Sprayer

$15.
1/16" to ¼" pipe size

OVER A MILLION IN USE!

Just pulling the trigger of the MURPHY PISTOL SPRAYER shoots a stream of blackening into inner pockets that could never be reached by the old-fashioned brush or swab method. This sprayer was designed by a practical foundryman and now it is widely used for cleaning permanent molds, for aluminum and other metals, and also for sand-blasting.

Also a complete line of products designed to banish moisture from all kinds of air compression systems—Aftercooler, Separators, Filters, Traps, and Regulators.

Write for descriptive literature.

PRICES COMPLETE WITH SUCTION HOSE AND SINKER

PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$15.00	$15.00	$15.00	$17.50	$22.00

THE HAMILTON SPRAY GUN

$15.
F.O.B. HAMILTON, O.

Complete with a 4½ ft. length of suction hose and sinker. For spraying molds and cores with liquids, for cleaning motors and machinery, for laying dust, for spraying hot roofing materials, and many other uses. Trigger control, guaranteed.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
SPRAY GUNS • PISTOL SPRAYERS

JAS. A. MURPHY & CO., INC.
HAMILTON, OHIO
Moisture Elimination Up To 3000 Pounds Per Square Inch

TERRE HAUTE
SPECIAL
FOUNDRY COKE

A QUALITY PRODUCT

Sold Exclusively by
REPUBLIC COAL & COKE CO.
8 South Michigan Ave., Chicago 3, Illinois
BRANCHES: Peoria • New York • Indianapolis • Milwaukee • Minneapolis • St. Louis
Detroit • Cleveland • Cincinnati
Manufactured at Terre Haute, Indiana by INDIANA GAS & CHEMICAL CORPORATION

RADIOGRAPHY Co-60 Ir-192

Tracerlab

Cobalt-60 and Iridium-192 RADIOGRAPHY SOURCES

. . . and *all* necessary accessories are available for *low cost* industrial radiography. With the versatility, practicality and portability offered by radioactive sources, even the smallest firm can now afford to radiograph work to PROVE its quality.

NEW LOW PRICES

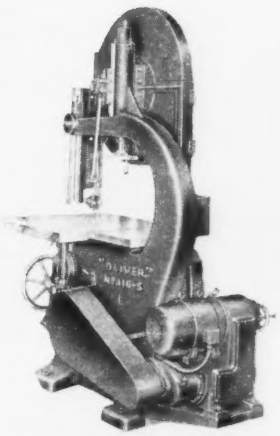
FREE booklet covers sources, containers, handler, survey and personnel protection instruments. Write TODAY for your copy.

Tracerlab INC.
130 HIGH ST., BOSTON
2295 SAN PABLO AVE., BERKELEY

"OLIVER" METAL CUTTING 30-inch BAND SAW

. . . with variable low-speed drive cuts heavy cross-sections with ease!

. . . or with high-speed motor for cutting sheet steel, metals, plastics and wood

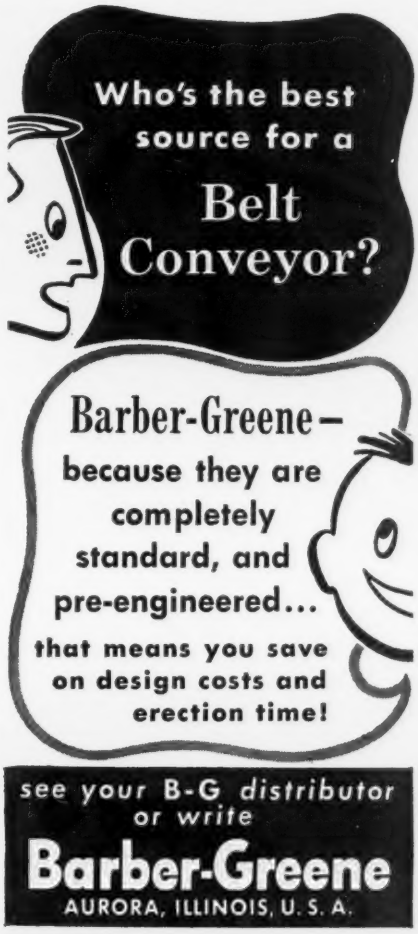


This powerful Band Saw cuts true, steady and smooth. Extra large capacity under guide. Has variable low-speed drive with geared head direct connected to lower wheel for cutting light and heavy cross sections. Also furnished with high-speed motor for cutting woods, compositions, sheet metals. Quick-change rim and tire. *Ask for Bulletin No. 217-S.*

"Oliver" Metal Cutting Band Saws also made in 18", 36" and 38" sizes

OLIVER MACHINERY COMPANY

Established 1890 GRAND RAPIDS 2, MICHIGAN


Who's the best source for a Belt Conveyor?
Barber-Greene – because they are completely standard, and pre-engineered... that means you save on design costs and erection time!
see your B-G distributor or write
Barber-Greene
AURORA, ILLINOIS, U. S. A.

SMOOTHER CORES

DRYING TIME IS CUT

DISCARDS REDUCED

LARGEST SELLER IN THE FIELD!

Kordek, the preferred dry bond for cores...

Full technical service, without obligation, is available to show how you can profit from the use of MOGUL® Cereal Binder in your production.

Write Technical Sales Department

CORN PRODUCTS REFINING COMPANY

17 BATTERY PLACE, NEW YORK 4, N. Y.

PP INC.

What's Your Scrap Loss?

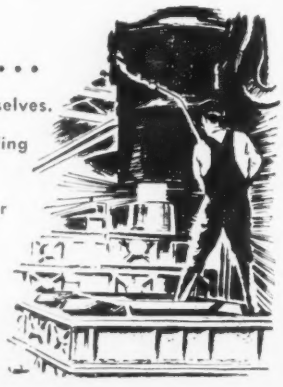
A *few cents* invested in genuine Porcelain Products Ceramic Strainer Cores *can save you dollars in production costs!*

With PP INC. Ceramic Strainer Cores in the gates, you'll turn out *improved* castings free from slag . . . *cleaner* castings that mean *fewer rejects* and *less time* in the cleaning room. In short, *higher quality* castings for your customer . . . *and at no extra cost,* because the additional foundry profits realized from increased production, fewer rejects and lower cleaning costs will more than pay for PP INC. Ceramic Strainer Cores used.

May we send samples and complete information?

Look at these Advantages . . .

- Economical to use . . . pay for themselves.
- Substantially reduce chipping, welding and grinding.
- Dependable . . . won't fracture under molten heat.
- Available in sizes to cover a wide range of requirements.
- Packed for safe, easy handling.



Porcelain Products, Inc.
FINDLAY, OHIO

FOUNDRY

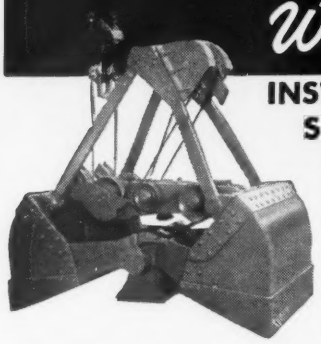
EDWIN S. CARMAN, INC.

LEE ROAD AT MAYFIELD
CLEVELAND 18, OHIO

A COMPLETE FOUNDRY SERVICE

MODERNIZATION

WELLMAN
Williams Type



INSTANT "ON-AND-OFF" SERVICE ANYWHERE

The Wellman "Hook-on", single-line bucket is designed to provide clamshell bucket service at any crane hook where suitable head room and hoist capacity are available.

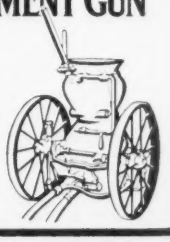
Hook the yoke over the crane hook and the bucket is ready for work. When the job is finished, take the yoke off the hook and the crane is free for other duties.

Capacities from ⅜ to 2 cubic yards. Write for free bulletin.

THE WELLMAN ENGINEERING CO. 7019 CENTRAL AVE. CLEVELAND 4, OHIO

REDUCE *cupola* MAINTENANCE COSTS with a "CEMENT GUN"

Use a "Cement Gun" to place refractory material in cupola restoration . . . save time and labor . . . reduce costs. Write for free "Cement Gun" catalog F2400.



CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES – ALLENTOWN, PA., U. S. A.

MANUFACTURERS OF THE "CEMENT GUN"

HOW TO USE THE CUPOLA

$1.00 Postpaid

NEW 36 PAGE HANDBOOK
by Bernard P. Mulcahy,
Pres. of Fuel Research Lab. Inc.

13 HELPFUL CHAPTERS ON ALL PHASES OF THE CUPOLA. "How To Use The Cupola" . . . . 13 idea-packed chapters based on the practical experience of a man who has devoted his life to foundry fuel and melting problems. It's a mighty useful handbook—a handy source of information which will pay for itself many times over in the months and years ahead.

Book Department
THE PENTON PUBLISHING CO.
1213 W. Third St. Cleveland 13, Ohio

TOPS FOR PRODUCTION OF HIGH GRADE STAINLESS, ALLOY AND RIMMING STEELS

Heroult

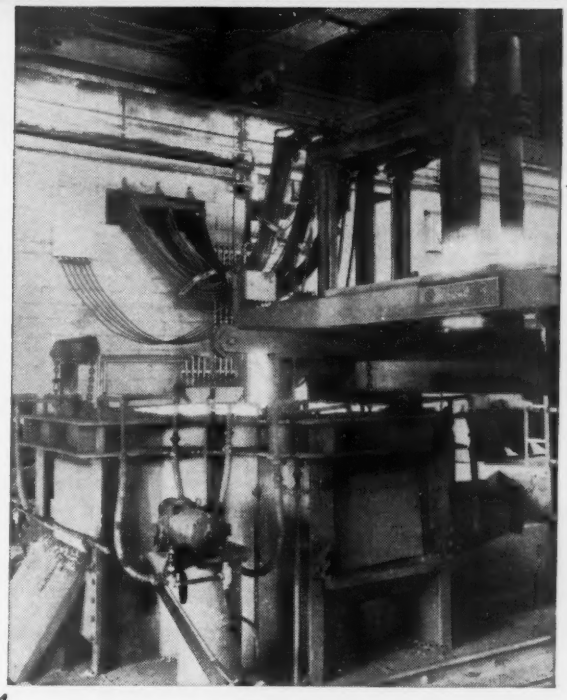
ELECTRIC MELTING FURNACES

EMBODYING the latest in mechanical and electrical equipment, these widely used furnaces are noted for their efficient performance and safety, and low operating cost and maintenance.

We welcome an opportunity to help you select and install the furnace best suited to your particular requirements.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

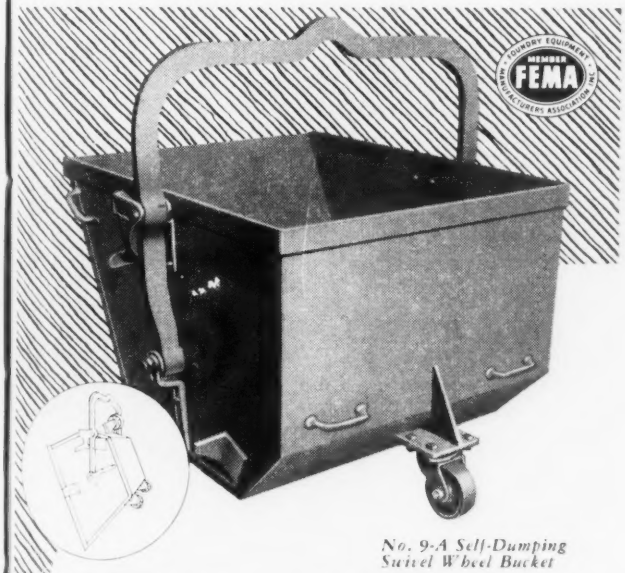
Contracting Offices in New York, Philadelphia, Chicago,
San Francisco and other principal cities.
United States Steel Export Company, New York



Removable roof of new design now available for large furnaces.

USS

UNITED STATES STEEL



No. 9-A Self-Dumping Swivel Wheel Bucket

PENN BUCKETS...

Careful balancing makes Penn Buckets self-dumping when loaded and self-righting when empty. Welded construction prevents "clinging", makes them empty easily and completely. The swivel wheel increases handling efficiency, too.

WRITE TODAY FOR NEW BULLETIN AND DIMENSION SHEET

PENN IRON WORKS, INC.
READING, PENNA.

PHILADELPHIA COKE

PHILADELPHIA COKE COMPANY
4501 Richmond St.
Philadelphia 37, Penna.
PHONE: DELAWARE 6-3100

•

Producers of

FOUNDRY · METALLURGICAL
INDUSTRIAL COKE

Imitated by Many—
Not Equaled by Any

Built with Integrity!

ROURA Self-Dumping HOPPERS SAVE TIME and MONEY

The business principles that stand behind a product's manufacture mean more than *just* selling any one job. Roura Hoppers are ruggedly built, not to only carry the load, but to stand up under the abuse that all materials handling equipment receives from average lift-truck operators. We have found that it's not the load that destroys equipment but the use and manner that lift-truck operators have of banging into all equipment of this type.

Slash production costs . . . get these 4 plus features: 1. Submerged arc welds that are "stitched" with the same apparatus used for "stitching" high pressure steam boilers, assuring long life; 2. Exclusive, patented instant release handle; 3. Simple, safe material handling; 4. Quality-built, it pays for itself *fast* many times over. Handling wet or dry, hot or cold bulky materials quickly and easily, Rouras require only one man for distributing and unloading —he does it in a lot less time than under old fashioned methods.

Sizes ½, ¾, 1, 1½ and 2 cubic-yards. Rouras are built to fit either fork or platform type lift-trucks. Can also be had with special combination fork-platform skid, or with a live skid. Can be equipped with special flanges to permit stacking for storage or future distribution of materials, solving floor space limitations.

Only ROURA Has The Exclusive PATENTED Instant Release Handle

—Can Be Coated With Acid-Resistant Paints

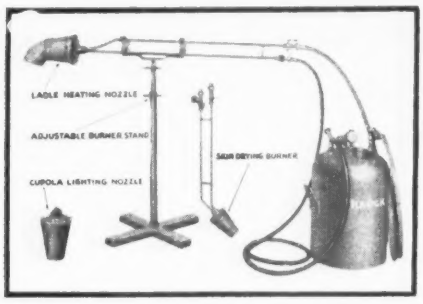
Write today for detailed brochure, "In Dollars & Sense."

ROURA IRON WORKS, Inc.
1417 Woodland Ave. Detroit 11, Mich.

---

1 OUTFIT DOES ALL 3

Dries Molds
Heats Ladles
Lights Cupolas



HAUCK
All-Purpose
OIL OR GAS BURNER EQUIPMENT
Simple
Speedy
Economical

•

Get Catalog 1043

The many heating jobs this Hauck Foundry Outfit performs is positively amazing! Interchangeable nozzles make the equipment equal to 3 separate burners. Burns fuel oil, kerosene or any fuel gas, with compressed air. No preheating; no carbon. Flame size instantly adjustable. Eliminates smoke, noxious gases, ashes.

HAUCK MANUFACTURING CO.
Oil and Gas Burners for Core Ovens, Annealing Furnaces, Heating and Drying
106 TENTH STREET • BROOKLYN 15, N. Y.

COLOR YOUR CORE SANDS

Modern foundries have found it practical to color their various grades of core sands. This eliminates guesswork and assures the proper use of the required type of core sand for the particular job at hand.

Our laboratories have developed a line of special dyes in a range of colors that have been carefully tested and found suitable as well as economical.

Write us for details and samples.

EATON CHEMICAL AND DYESTUFF COMPANY

1490 Franklin Street Established in the year 1838 **Detroit 7, Michigan**

Canadian Branches: Windsor and Toronto

CENTRIFUGALLY CAST

AUTOMOBILE CYLINDER LINERS

DIESEL ENGINE LINERS

BRONZE BUSHINGS

on the new
WATER-COOLED
Model M-WC
(Illustrated)

Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings.

Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for new Bulletin # 153 Illustrating Model M-WC

RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal castings at low cost.

Centrifugal Casting Machine Co.
P. O. Box 947 Tulsa 1, Okla.

Here's Why Maynard Steel Company Uses R & J Aluminum Bottom Boards!

1. No heavier than wood—but won't char, smoulder, or burn like wood.
2. Much cheaper than magnesium—and won't fuse.
3. R & J's are scientifically designed for extra strength, and properly vented for gas release.
4. R & J's are pound for pound less expensive than flimsier competitive brands.
5. R & J's stand up year after year. (Boards in foreground have taken 7 years' constant use at Maynard)

R & J Aluminum Bottom Boards can be custom-made to meet YOUR particular requirement or design. For full details—price list—quotations, contact:

R & J Foundry Co. 610 South 94th St. Milwaukee 14, Wis.

DESULPHURIZE *ECONOMICALLY*

with

COLUMBIA-SOUTHERN SODA BRIQUETTES

Time and labor are important factors in desulphurizing and cleansing iron as is true in every other Blast Furnace and Foundry operation.

Columbia-Southern Soda Briquettes act fast because their pellet shape, about the size of a walnut, exposes a maximum of surface area for contact with the iron. With fewer manhours required, production can be accelerated while labor costs are actually reduced.

There are no dusting losses with these briquettes. Working conditions are improved and waste is eliminated. They always hit the mark. You can always depend on fast, efficient results.

Order your supply today by name "Columbia-Southern Soda Briquettes." Packed in 100 lb. paper bags, they are easy to handle, easy to store, and easy to transport.

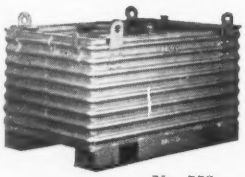
COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER, PITTSBURGH 22, PENNSYLVANIA

District Offices: Boston • Charlotte • Chicago • Cincinnati • Cleveland Dallas • Houston • Minneapolis • New Orleans • New York • Philadelphia Pittsburgh • St. Louis • San Francisco

Here's why

rugged BRUSCO handling equipment increases efficiency

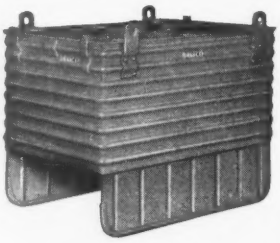
BRUSCO CORRUGATED STEEL BOXES



No. 558

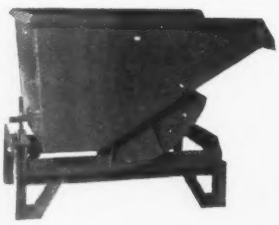
Save floor space — stack safely from floor to roof. Four way entry for fast, efficient handling. Equipped with crane lugs for movement by crane. Fabricated from heavy gauge corrugated steel to give added rigidity and maximum strength. Thoroughly and securely arc welded for longer, maintenance free life. Made in various sizes and load capacities to suit your requirements.

No. 559 BRUSCO CORRUGATED SKID BOX



Saves valuable floor space and speeds production. Made in all sizes and various gauges of steel to fit any load capacity. Stack from floor to roof.

No. 1210 BRUSCO SELF DUMPING HOPPER



Speeds production and saves labor in handling your parts and materials. This hopper is fabricated of heavy steel plate thoroughly reinforced. Made in ½, 1, 1½ and 2 cubic yard capacities. Underclearance is optional.

Write today for new Bulletin No. 500 presenting the most complete line of Part Boxes and Brusco Self Dumping Hoppers on the market.

Brusco

HANDLING EQUIPMENT

BRUMMELER STEEL PRODUCTS CORPORATION

1412 Ionia Ave., S. W. Grand Rapids, Michigan

EMPIRE

"THAT GOOD" FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION

2201 First Ave., North • Birmingham 3, Ala.

Phone 3-9135

A BETTER Pattern FINISH

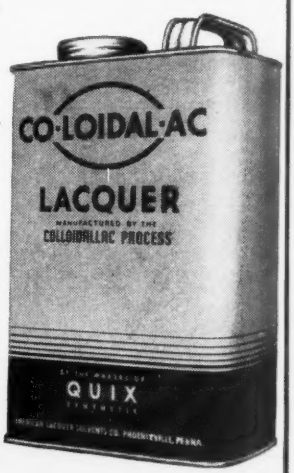
CO-LOIDAL-AC Lacquer is a one-coat finish that dries fast. It gives a hard, long-wearing surface that eliminates sticking. It's easy to apply and never settles in the can.

Join the long list of foundries who swear by the advantages of CO-LOIDAL-AC. Send in a trial order today. Available in gallons or drums, clear or colors.

WRITE FOR COMPLETE INFORMATION

AMERICAN LACQUER SOLVENTS CO.

Perkiomen Junction, Phoenixville, Pa.



CROBAUGH LABORATORIES

Chemists—Metallurgists

FOUNDRY SERVICE

THE FRANK L. CROBAUGH CO.

Phone SUperior 1-4712 CLEVELAND 13, O.

SHORT CUT TO PROFITS

1 Ohio MAGNETS

WELDED AND BOLTED TYPES • ALL SIZES • COMPLETE CONTROL EQUIPMENT • 26 YEARS A LEADER IN MAGNETIC MATERIALS HANDLING.

THE OHIO ELECTRIC MFG. CO. • 5900 MAURICE AVE. • CLEVELAND 4, O.

Associate Member Institute of Scrap Iron and Steel, Inc.

A-2757

GLOSSARY OF FOUNDRY TERMS

Compiled by Ed Bremer, FOUNDRY Metallurgical Editor

This extensive glossary of foundry terms was compiled from a wide variety of sources. Arranged in handy booklet form, it is a valuable reference for every foundryman. *48 pages.*

$1.00

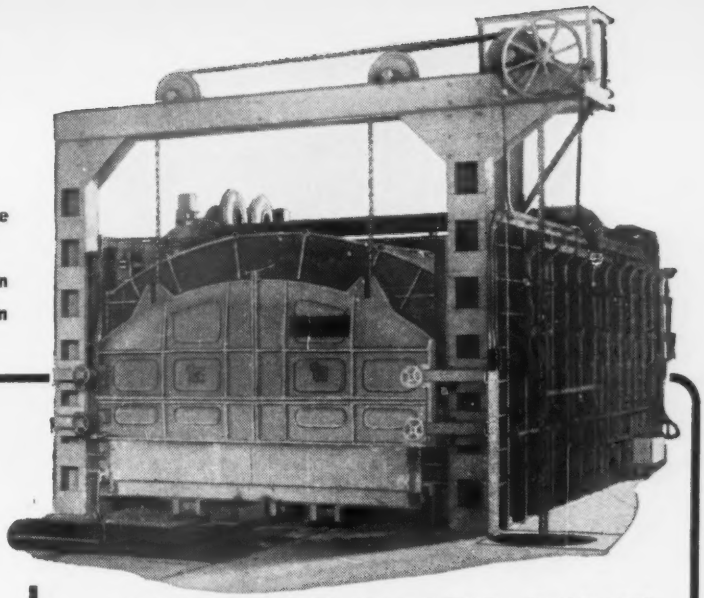
PENTON PUBLISHING COMPANY, Book Department

1213 West Third St., Cleveland 13, Ohio

MAHR CAR BOTTOM ANNEALING FURNACES

Give you . . .

• Faster heat • Wider temperature range • More uniform heat penetration • Lower operating costs • More rugged construction for longer service life • Over 40 years experience in furnace building



Mahr Car Type Annealing Furnace Rated Size: 7′ x 16′ x 3′6″

COMES EQUIPPED FOR . . .

Oil or Gas Firing—Manual or Automatic Temperature Control

ARE ADAPTABLE FOR . . .

• Carburizing • Hardening • Drawing • Normalizing • Stress Relieving • Tempering • Spheroidizing

OTHER MAHR FURNACES:

Standard • Batch • Pusher • Continuous • Rotary • Pit • Gas or Oil Fired

WRITE for Equipment Bulletin No. 200. Specifications cover 23 rated sizes from 4′ x 6′ x 2′ to 9′ x 20′ x 4′6″. Complete information supplied promptly on any other size.

MAHR MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.
MINNEAPOLIS, MINNESOTA, U.S.A.
1804 N. 2ND ST.

GRAY IRON FOUNDRIES Simplify Chill Control . . .

with

TELLURIUM

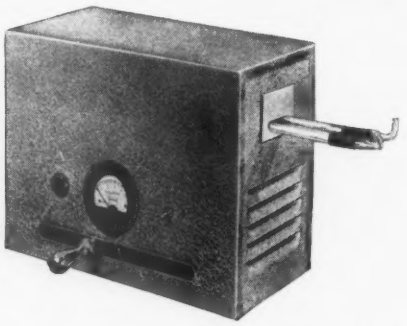
Available in 1, 2, 3, and 4-gram tablets; also in powder, slabs and sticks. For full information, write Dept. LM for 16-page article on the use of TELLURIUM in chill control.

American Smelting and Refining Company
120 BROADWAY • NEW YORK 5, N. Y.

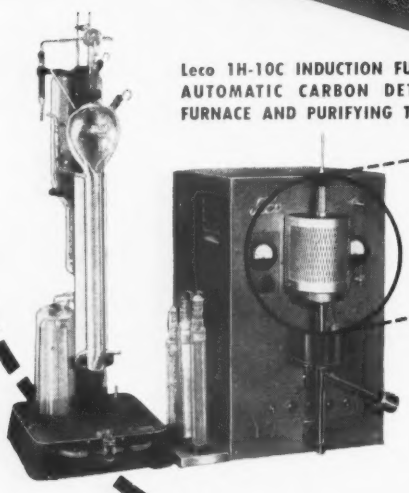
There's a HERMAN NELSON UNIT HEATER steam—hot water—gas to solve your heating problem

For some "HOT NEWS" on these new heaters write to:

American Air Filter
COMPANY, INC.
215 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.



Leco COPPER OXIDE CATALYST FURNACE



Leco 1H-10C INDUCTION FURNACE WITH Leco SEMI-AUTOMATIC CARBON DETERMINATOR, CATALYST FURNACE AND PURIFYING TRAIN

PATENTED JET COMBUSTION TUBE FOR INSTANTANEOUS IGNITION OF SAMPLE. REDUCES ANALYSIS TIME AND INSURES COMPLETE COMBUSTION.

Leco

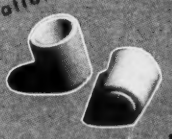
INDUCTION FURNACE FOR CARBON ANALYSIS OF IRON, STEEL, FERRO-ALLOYS

for both gasometric and gravimetric procedures—

Features

- Patented jet combustion tube.
- Safety catch pan for hot crucibles.
- Catalyst furnace for complete conversion to CO_2
- Selector switch adjusts power input to sample.
- And most important of all—

Leco induction furnace crucibles offer the best resistance to slag penetration and thermal shock



There are more Leco Rapid Carbon Determinators in use than all other makes combined.

WRITE FOR LITERATURE

LABORATORY EQUIPMENT CORP.
ST. JOSEPH 8, MICHIGAN

Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.
ORWELL, OHIO • U. S. A.
SALES ★ SERVICE ★ STOCK ★ COAST TO COAST

EF

GAS, OIL AND ELECTRIC
FURNACES

For all annealing and heat treating requirements

THE ELECTRIC FURNACE CO. • SALEM, OHIO
Canadian Associates • CANEFCO LTD. • Toronto 1, Canada

Tamms

AMORPHOUS
CRYSTALLINE
DIATOMACEOUS

SPECIAL SILICAS

SIZE RANGE FROM 100 MESH TO 600 MESH

WRITE FOR PRICES AND SAMPLES—

- All grades of silica ideal for precision casting by the investment molding process
- Will meet the exacting requirements of most precision casting work
- Precision quality to assure uniform casting performance

FINE • PURE • WHITE • UNIFORM

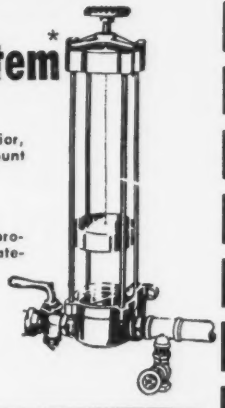
TAMMS INDUSTRIES, INC. Dept. RM-12
228 N. La Salle St. Chicago 1, Ill.

TUMBLING BARRELS

Roller Bearing throughout
Direct Motor Drive with Speed Reducer
V Belt Motor Drive—Tight & Loose Pulley Drive

ROYERSFORD FOUNDRY & MACHINE CO.
BOX F
ROYERSFORD, PA.

REDUCE OPERATING COSTS
with
AQUADYNE
Wet Water system*



• FOR CORE SAND MIXTURES

AQUADYNE Wet Water produces a vastly superior, smoothly blended sand mix and reduces amount of core oil needed.

• FOR MOULDING OPERATIONS

AQUADYNE Wet Water spreads, diffuses and produces a faster penetration with moulding materials—resulting in sharper, cleaner castings and fewer rejections.

• FOR SAND CONDITIONING

Sand mixing is simpler, faster and more efficient. The Aquadyne System saves water, as well as time because its unusual low surface tension gives instantaneous coverage of each grain of sand it touches.

The HYDROBLENDER

• FOR DUST CONTROL

There's nothing better than AQUADYNE.

Write for our free booklets, "The Theory of Wet Water" or "Controlling Dust in Industrial Plants"

**Any ordinary water supply can be hooked up to our specially designed Hydroblender. Each Aquadyne multi-phase cartridge gives 1,000 gallons of wet water for less than ⅓ cent a gallon.*

AQUADYNE CORPORATION

441 LEXINGTON AVENUE
NEW YORK 17, N. Y.
TEL: VANDERBILT 6-2750

NEWCOMB-DETROIT

PIONEERS IN ENGINEERING, MANUFACTURING & INSTALLING OF

"Uni-Wash"
DUST COLLECTORS
Recirculating Water Type
—Compact—Efficient—Proven by Foundry Users

•

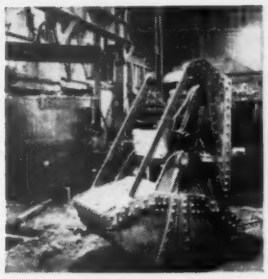
"Scroll-Aire" CORE OVENS
More Air Circulation—
Faster Bake and
Better Cores

ESTABLISHED 1912
- DETROIT DIVISION
- GRAND RAPIDS DIVISION
- NEWCOMB INDUSTRIES, LTD., WINDSOR DIVISION

For Bulletins and Quotations, Wire, Write or Call—
NEWCOMB-DETROIT
5755 Russell St.,
Detroit 11, Mich.
TR 3-2100

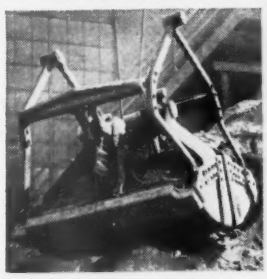
These Four BLAW-KNOX *Buckets*
Help Solve Your Rehandling Problems for Average or Unusual Conditions

FOR AVERAGE HEADROOM



THERE is a type and size of Blaw-Knox Single-Line Hook-On Foundry Buckets to meet a wide range of operating conditions. Blaw-Knox can best give you the competent engineering service that makes possible selection of the bucket suited to your needs.

FOR EXTREMELY LOW HEADROOM

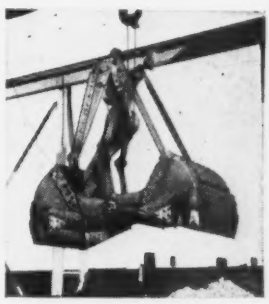


THIS Single-Line Hook-On Bucket solves rehandling problems when headroom is extremely limited. The ¾ yd. capacity bucket requires only 6'7" operating headroom. Also available in larger sizes.

FOR COKE AND SAND
"Shark Tooth" Single-Line Hook-On Buckets

HERE'S the answer to the problem of handling coke and sand . . . simply by adding or removing liner plates, the *same* dual purpose Blaw-Knox Bucket handles both, with minimum degradation of coke and without sand leakage! The illustration at the upper right shows an open head type Single-Line Hook-On Bucket, rated 1 cubic yard, with liner plates applied inside of the shark teeth for handling sand, coal, small limestone and granular fines. Illustrated at the right is a closed head type 1 cubic yard Shark Tooth Bucket without liner plates for coke handling.

Blaw-Knox Shark Tooth Buckets are available in a wide range of sizes and for different headroom conditions.



Write for Bulletin 2232 today

BLAW-KNOX COMPANY
Blaw-Knox Equipment Division
2097 Farmers Bank Bldg., Pittsburgh 22, Pa.
New York • Chicago • Philadelphia • Birmingham
Washington • San Francisco

BLAW-KNOX
FOUNDRY BUCKETS

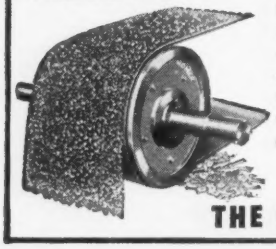
FOR SAND SLINGERS, CONDITIONERS AND CONVEYORS . .

HERE IS THE ANSWER TO YOUR MAGNETIC SEPARATOR JOBS!

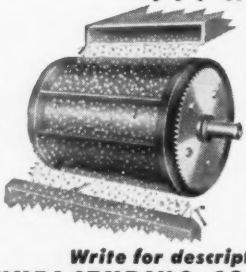
HOMER "Power-Plus" Magnetic Separators

Permanent non-electric—Unaffected by Heat, Cold, Moisture

. . . CAN BE USED INSIDE or OUTSIDE PLANT . . .



Homer MAGNETIC PULLEYS and UNITS —Available in standard diameters from 12" to 30"; belt widths 4" to 60". Special sizes upon order.



Homer MAGNETIC DRUMS—Available in standard diameters from 12" to 30"; face widths 4" to 60". Can be furnished with or without enclosure.

Homer MAGNETIC PLATES—Available in standard widths from 4" to 26"; lengths and number of poles as required. Special fabrications to your specifications.

Write for descriptive bulletins

THE HOMER MANUFACTURING CO., INC., DEPT. 156, LIMA, OHIO

Where a Hole Counts

The Open Head of the Cleveland Coil Head Radiator Chaplet makes it easy to pack sand solidly under head and around the stem. This ensures better support for the chaplet, more rigidly held cores — reduced castings rejects.

SAND PACKS BETTER

Patented

WRITE FOR BULLETIN showing our line of Coil Head and Square Head Radiator Chaplets, also Motor, Boiler, Forged Head, Fitted Head, Double Head and other types.

CLEVELAND CHAPLET & MFG. CO.
26470 Lakeland Blvd., Euclid, Ohio

CLEVELAND Chaplets
Since 1890

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.

Manufacturers of Pneumatic Tools Since 1903

DAYTON, OHIO

COST CONTROL WESTOVER ENGINEERS

Westover ENGINEERS

FOUNDRY MANAGEMENT CONSULTANTS
3110 WEST FOND DU LAC AVE., MILWAUKEE 10, WIS.

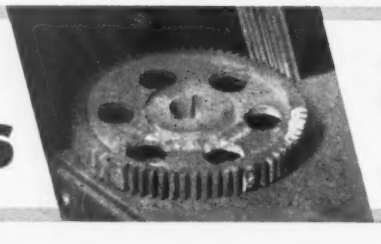
There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

PRODUCERS CORE SAND CORPORATION

PITS AT MICHIGAN CITY, INDIANA AND SAWYER, MICHIGAN

MICHIGAN CITY, INDIANA

SALVAGE CASTINGS



with MARQUETTE NICOL-ROD No. 44

Cast or Malleable Iron Machineable . . . without Preheating

Worth its weight in gold for repairing defective castings, castings sand pockets, machining errors, etc.

Marquette Manufacturing Co., Inc. 307 E. Hennepin Ave. Minneapolis 14, Minn.

Step ahead in this five billion dollar market with

Foundry's

PLUS 5 SERVICE

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

A Penton Publication

FOUNDRY

more than a magazine . . . a complete sales development service

Penton Building, Cleveland 13, Ohio

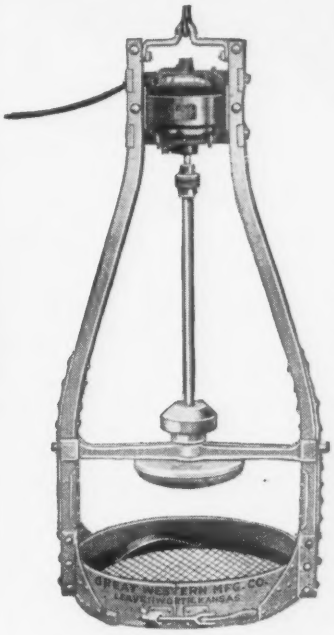
CLEANS as it SCREENS

World Famous

COMBS

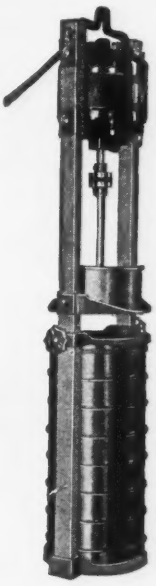
Gyratory Foundry

RIDDLES



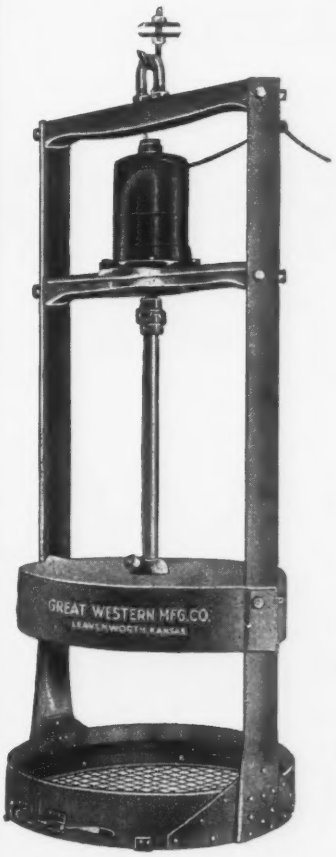
← Type "V"

Screens sand Fine, Coarse, Medium, 20" dia. sieve with special clamp for 5-second changes. Does work of 10 men. Fully-enclosed 1/6 h.p. motor. 4' 6" high, weight 100 lbs. 20" Sieve: $250.00. Giant V-5, 36" Sieve: $450.00



← Type "HL"

Laboratory model . . . specially designed for sand control. Fitted with 1/6 H.P. motor. Price, complete less sieves: $225.00



← Type "CR"

24" dia. round sieve. Thoroughly sifts, mixes, fluffs, aerates the sand. 1/3 H.P. enclosed motor. Height 4' 6", weight 250 lbs. Complete: $310.00

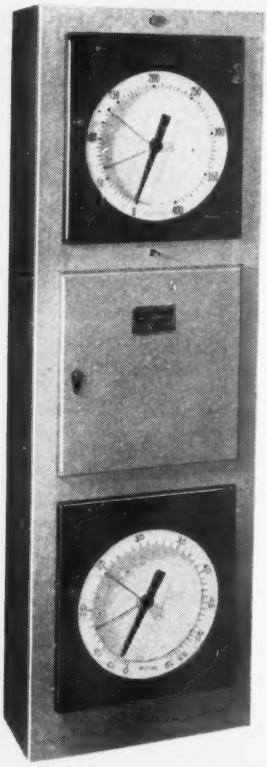
Type "CS"

24" square sieve. Continuous operation, no dumping. Refuse tails off to one side. Height 4' 10", weight 295 lbs. With 1/3 h.p. enclosed motor. Complete: $320.00

Prompt Delivery from Your Foundry Supply House

GREAT WESTERN MFG. CO.

LEAVENWORTH • KANSAS



Save MAN HOURS and CASTINGS

1. Automatic Sand Tempering Unit

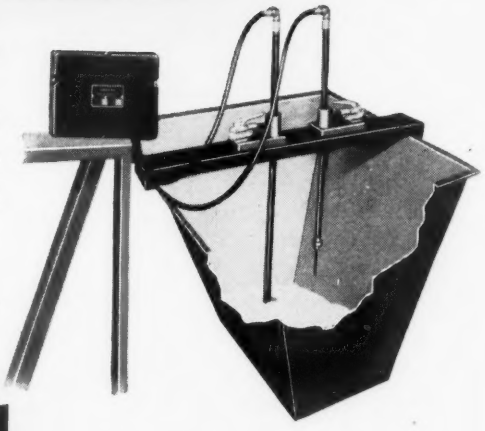
Automatically insures correctly tempered sand at the molders' hopper.

Measures exact moisture in return sand and adds required water to bring sand to temper.

Measures temperature of return sand and adds evaporation water required.

2. Hoppertrol

Automatically fills sand hoppers and bins by controlling plow action.



CONTROL EQUIPMENT
SAND · MOLD · MOISTURE
CARBON · SULFUR

HARRY W. Dietert COMPANY

9330 ROSELAWN AVE. · DETROIT 4, MICHIGAN

Write for LITERATURE

CLASSIFIED ADVERTISING

Help Wanted

WANTED
BY SUBSTANTIAL
NEW YORK COMPANY
MAGNESIUM SAND-CASTING EXPERT

Must be able to set up and develop a magnesium sand-casting foundry including selection of equipment, operating manufacturing department and technical development.

Write in detail, state salary desired.

BOX 869

FOUNDRY **CLEVELAND 13, OHIO**

METALLURGIST

Gray iron foundry needs metallurgist with some knowledge of ductile iron and shell molding. Give name, full details, and salary expected.

BOX 866

FOUNDRY **CLEVELAND 13, OHIO**

CHIEF INSPECTOR
FOR STEEL FOUNDRY

Medium sized steel foundry located in the East requires chief inspector. Company manufactures valve, turbine, machine tool and ordnance castings from 1 lb. to 2,000 lbs. In reply give details of experience, salary desired, etc. Address: Box 856, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

FOUNDRY FOREMAN

To supervise the molding, coremaking, melting, pouring and cleaning room operations of the second shift in a small high alloy steel foundry located in New Jersey. This is a permanent position, calling for a man with working experience in at least two of the above departments, in addition to supervisory experience over about 30 men. Furnish complete resume of experience, education and salary expected. Our employees know of this ad.

BOX 881

FOUNDRY **CLEVELAND 13, OHIO**

CONSULTING AND
SERVICE METALLURGIST

Must have technical background and malleable foundry experience.
Should have inclination and personality to work towards sales position and be prepared to travel. Write stating full details and salary expected.

BOX 729

FOUNDRY **CLEVELAND 13, OHIO**

FOREMAN

Shift supervisor for new, small gray iron foundry in Cleveland area producing light, cored and solid castings of special type. Must understand all phases of light foundry operation and have ability to organize and supervise men. Foundry is a new branch of old, established firm with excellent financial backing. Opportunity to grow is unlimited. Write, stating qualifications. All replies held confidential. Address: Box 850, FOUNDRY, Cleveland 13, Ohio.

CORE ROOM SUPERINTENDENT

For completely mechanized Eastern foundry. Experienced in all phases of core blowing, sand control and establishing production standards. State age, experience and salary requirement. Address: Box 862, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

FOUNDRY SALES ENGINEER

Large production gray iron foundry located in Central Wisconsin. Seeking experienced man to head sales for its sizeable shell molding department. Write, giving full details of personal background, experience, salary expected, etc.

BOX 865

FOUNDRY **CLEVELAND 13, OHIO**

HELP WANTED

Company is contemplating starting a permanent mold factory in Northern Indiana. Must have a man with experience to help establish and supervise this operation. If you are a man who wants to work and grow with this company, we are interested in you. Please send full particulars.

BOX 853

FOUNDRY **CLEVELAND 13, OHIO**

FOUNDRY SUPERINTENDENT

Unusual opportunity in medium size brass, aluminum and iron foundry in Southeast. Long-term expansion program requires superintendent with thorough knowledge of machine and floor molding, gating and setups for jobbing and production work. Applicant must know all phases of foundry work and be capable of producing pressure-tight and porous-free castings economically. Prefer applicant not over forty-five years of age. State qualifications and salary expected. Address: Box 864, FOUNDRY, Cleveland 13, Ohio.

METHODS AND TIME
STUDY ENGINEER

Experienced in production iron foundry. First class man required. Relocate Middlewest. Address: Box 878, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

FOUNDRY SUPERINTENDENT

Long established and well equipped iron foundry producing castings to rigid specifications seeks a qualified foundry superintendent. Must have a thorough knowledge of every phase of operation, including quality control, scheduling and be able to coordinate production of all departments to optimum capacity. Size range 5# to 25 ton castings. This position commands a good salary and good prospects. Send resume of experience with application. All replies will be held strictly confidential. Location of foundry Eastern Pennsylvania.

BOX 870

FOUNDRY **CLEVELAND 13, OHIO**

PATTERN SHOP FOREMAN

Long established and well equipped iron foundry seeks, for immediate employment, pattern shop foreman fully qualified to direct construction of new pattern equipment, supervise alteration and initiate a standardization program to increase foundry production. Gating and risering experience important. Age 32-45 preferred. Salary commensurate with experience and ability. Send resume of experience with application. All replies will be held strictly confidential. Location of foundry Eastern Pennsylvania.

BOX 871

FOUNDRY **CLEVELAND 13, OHIO**

SUPERVISOR

Thoroughly experienced in high production mechanized jobbing foundry operation. Must have record of ability to handle men and thorough knowledge of modern equipment and methods. Established Eastern Foundry. State age, experience and salary. Address: Box 873, FOUNDRY, Cleveland 13, Ohio.

SALES ENGINEER

Manufacturer of foundry supplies requires services of sales engineer for the territory of Northern Indiana and Northwestern Ohio. Address: Box 851, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRYMAN

Capable of assuming full charge small or medium foundry. Nonferrous or gray iron. A-1 on layout, gating, risering, rigging. Twenty-five years practical and technical experience. Jobbing or production. Age 43, married. Will relocate. Address: Box 863, FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT

Capable, qualified and experienced to supervise all phases of foundry activities, in gray iron or malleable iron. Twenty-five years of actual foundry operations. Technical education. Address: Box 882, FOUNDRY, Cleveland 13, Ohio.

WEIGHT ESTIMATING

Estimating of casting weights furnished by return mail. Accurate, reliable and confidential service. Automatic calculator equipment. Nominal fee. Send blueprints to: **CHARLES E. ROLAND, ITASCA, ILLINOIS.**

FOUNDRYMAN

High production gray and malleable iron. Fifteen years' experience. Well versed in foundry problems, namely scrap analysis, core and molding problems, gating and rigging, and pattern design. Age 33. Engineer graduate. Will consider any job capable of doing, any location. Address: Box 874, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry machine and related lines. Address: Box 825, FOUNDRY, Cleveland 13, Ohio.

SHELL MOLDING ENGINEER

AGE 35, SHELL MOLDING PIONEER. PRESENTLY IN CHARGE FOR ONE OF LARGEST PRODUCERS OF SHELL MOLD CASTINGS. CAPABLE IN ALL PHASES OF SHELL MOLDING, DESIGN OF PATTERNS, EQUIPMENT, RESEARCH, ETC. ADDRESS: BOX 858, FOUNDRY, CLEVELAND 13, OHIO.

FOREMAN—WOOD PATTERNMAKING

Twenty years as foreman and department manager. Experienced in the machine tool and heavy mill industry. Also experienced in purchasing patterns and castings. Complete coordinating service. Iron and steel foundry background and connection. References and resume on request. Address: Box 868, FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE

Age 39, trained in general management, labor relations, sales and procurement for the foundry business. Wish to locate with small company that offers opportunity and challenge for development and inducement for the future. Address: Box 883, FOUNDRY, Cleveland 13, Ohio.

POSITION WANTED

Young man, 28, wants foundry position, year around work preferred. Seven years' experience as snap molder and coremaker in iron, bronze, aluminum. Married. Write P.O. Box 636, Tonkawa, Oklahoma.

FOUNDRYMAN

Superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron and nonferrous jobbing and high production shops. Now employed. Address: Box 768, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Not a magician, but a practical gray iron foundryman, healthy, honest, age 45. Twenty-five years in machine tool and engine casting, eight years and at present assistant superintendent. Desire a change. Make me a proposition. Address: Box 867, FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY EXECUTIVE

Well versed in all phases of foundry procedures available. Molding, light and heavy. Green and dry sand. Coremaking, cupola operation, gray iron metallurgy, foundry costs, customers contacts. Thirty years foundry executive experience various capacities. Presently employed. Address: Box 876, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT

Now available. Twenty-five years' experience in various capacities. Well versed in foundry operations. Light or medium electric casting, high speed tool steel, heat resisting metals. Address: Box 859, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Gray iron, 28 years' experience in production and jobbing, 10 years as a manager of plants with daily tonnages as high as 125 ton, employing up to 300. Man of unquestionable character and excellent ability. Know foundry thoroughly. Address: Box 814, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY TRAINING WANTED

Indian National, 29 years old. Seven years practical experience and training in a foundry in India. Seeking traineeship in American Foundry to learn modern methods. Address: Box 849, FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM SUPERINTENDENT

Available immediately. Twenty years' experience, can handle large or small. Have reputation of keeping up with foundry production. Address: Box 860, FOUNDRY, Cleveland 13, Ohio.

ENGINEER

Foundry, twelve years' experience in responsible supervision of open hearth melting and of all phases of heavy steel foundry and machine shop operations. Address: Box 885, FOUNDRY, Cleveland 13, Ohio.

ANALYTICAL CHEMIST

Extensive experience with iron, steel, ferrous and nonferrous alloys. Address: Box 855, FOUNDRY, Cleveland 13, Ohio.

Representatives Wanted

MANUFACTURERS REPRESENTATIVES

To handle a full line of quality electric furnace carbon and alloy steel castings—Crane Wheels, Conveyor Buckets and Chain, Sprockets, Gears and Pinions, Sheaves, Wire Rope Fittings, etc. St. Louis area and states of Kentucky, West Virginia, Southern Illinois, Indiana, Southwest Ohio, Western Michigan, and Central Pennsylvania open.

BOX 872

FOUNDRY **CLEVELAND 13, OHIO**

SALESMAN OF FOUNDRY SUPPLIES AND FACINGS

Well established company requires representative for Midwest territory. Must have well rounded foundry experience. In reply state age, experience, salary expected.

BOX 852

FOUNDRY **CLEVELAND 13, OHIO**

SALESMEN

Presently calling on aluminum and brass foundries to represent us on nonferrous fluxes. (Commission Basis.) Advise territory you cover regularly.

GENERAL FLUX CO.
2033 KEARNEY AVE.
RACINE, WISC.

SALES REPRESENTATIVES

Graphite crucible and refractories firm desires representation covering nonferrous foundries in Midwestern areas. Our men know of this ad. Your reply treated as confidential. Address: Box 886, FOUNDRY, Cleveland 13, Ohio.

MANUFACTURERS' AGENTS

To sell special nonferrous alloys on commission basis. Most territories open. Company well established in this field and in most territories can turn over active accounts. Address: Box 835, FOUNDRY, Cleveland 13, Ohio.

Available Capacity

CONTRACT MANUFACTURING FACILITIES AVAILABLE FOR
CUSTOM-BUILT MEDIUM AND HEAVY MACHINERY

Steel Fabricating Shop—Gray Iron Foundry
Pattern Shop—Machine Shop

OPEN TIME NOW
QUALITY WORKMANSHIP—PROMPT SERVICE

Engineering Service Available

For Complete Information, Write, Wire or Phone

ROBERT HOLMES & BROS. INC.
1-C JUNCTION AVE., DANVILLE, ILLINOIS

Capacity Wanted

WANTED

Foundry capable of supplying prompt delivery of closed end, cast iron thermocouple tubes.

PYROMETER SERVICE COMPANY
348 RIVER ROAD
NORTH ARLINGTON, NEW JERSEY

Employment Service

EMPLOYMENT COUNSEL, INC.

"All The Name Implies"

JOHN COPE, Manager Foundry Dept.

Recruiting men for employers in the foundry industry throughout the nation. Openings in Steel, Malleable, Gray Iron and Non-Ferrous—Jobbing and Production. Salaries to $20,000.

PLANT MANAGERS	SUPERINTENDENTS
GENERAL FOREMEN	MOLD FOREMEN
CORE FOREMEN	MELTING FOREMEN
CLEANING FOREMEN	MAINTENANCE FOREMEN
PATTERN FOREMEN	METALLURGISTS
INDUSTRIAL ENGRS.	TIME STUDY ENGRS.

And all other Administative and Sales Positions

WRITE or CALL for registration.

Completely Confidential.

SUITE 500
CHICAGO 2, ILLINOIS

7 WEST MADISON ST.,
FINANCIAL 6-2100

SALARIED PERSONNEL

$3,000-$25,000. This reliable service, established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: **JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.**

Wanted-To-Buy

WANT TO BUY

Experimental-size Detroit Type Electric Furnace—used. Preferably 50/75# capacity. Give complete details and price.

STANLEY FOUNDRIES
6009 SANTA FE AVENUE
HUNTINGTON PARK, CALIF.

WANT TO BUY

Always in the market for surplus used foundry equipment. Contact us before selling. Interested especially in complete plants. Will go anywhere.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON, PA.
PHONE: READING 7-1321

WANTED TO BUY

Financially sound company is interested in buying a permanent mold factory in Northern Indiana or Chicago district at a fair price. Please give full particulars.

BOX 854
FOUNDRY **CLEVELAND 13, OHIO**

WANTED

STEEL SHOT & GRIT

ANY GRADES—ANY SIZES

BEMCO COMPANY
511 FREEMAN **CINCINNATI 3, O.**

PERIODICALS

Wanted to buy for cash. Back volumes and sets of Transactions Am. Foundrymen's Society and other scientific and technical Journals. Address: **ASHLEY, 24 EAST 21, NEW YORK 10, NEW YORK.**

Wanted-To-Buy

WANTED

1—No. 2 Simpson Mill
1—No. 3 Simpson Mill
2—Osborn 712 Jolt Squeeze Pin Lift Molding Machines
3—Osborn 276 J Jolt Squeezers
2—SPO Jolt Squeezers Pin Lift Machines

ALL EQUIPMENT MUST BE IN GOOD CONDITION

MARCH-BROWNBACK CO., INC.
SOUTH & CHARLOTTE STS.
POTTSTOWN, PA.

WANTED

60 x 96

AMERICAN TUMBLAST

BOX 875
FOUNDRY **CLEVELAND 13, OHIO**

WANTED
ROOTS-CONNERSVILLE
POSITIVE BLOWERS

GREENE BROTHERS
511 FREEMAN **CINCINNATI 3, O.**
PHONE: MAin 2192

WANTED

Will rent medium sized gray iron production foundry in Eastern Pennsylvania, with option to purchase.

BOX 879
FOUNDRY **CLEVELAND 13, OHIO**

WANTED

Mechanized foundry located in the East. Must be reasonably priced.

BOX 880
FOUNDRY **CLEVELAND 13, OHIO**

WANTED TO BUY

Gray iron foundry located in Middle West producing squeezer or light roll-over castings. Equipment and business only. No real estate—personnel to stay. Address: Box 819, FOUNDRY, Cleveland 13, Ohio.

MACHINERY WANTED

Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: **P.O. BOX 1351, CHURCH STREET STATION, NEW YORK 8, NEW YORK.**

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

FOR SALE OR LEASE
GRAY IRON—ALUMINUM—BRONZE FOUNDRY

17,000 square-foot building is 80' x 210' on 5 acres with railroad spur. Complete with modern production equipment. Six-ton capacity cupola—200 tons per month. Present owner can use 25% to 50% of production. Selling to concentrate on primary business of manufacturing. Immediate occupancy.

CONTACT:
FRANK WHEATLEY, JR.
FRANK WHEATLEY PUMP & VALVE MFR.
HALE STATION, SAND SPRINGS ROAD
TULSA, OKLAHOMA

A GOING BRASS AND ALUMINUM FOUNDRY IN CALIFORNIA

High production methods
Low cost producer
Average sales $150,000 per year
For Sale or Lease
Purchase of real estate optional
Attractive terms to reliable party
Owner retiring

BOX 857
FOUNDRY **CLEVELAND 13, OHIO**

FOR SALE—100% or 50%

Business, plant and building (6300 square feet), lot 100 by 100, fully equipped. Six coke fired furnaces, tram rails, American Wheelabrator, Do-All band saw, Tabor cut-off, etc. Nonferrous metals. Established since 1919.

WORLD BRASS FOUNDRY INC.
762-770—64th STREET
BROOKLYN 20, NEW YORK

FOR SALE

Complete foundry and machine shop, ferrous and nonferrous metals. Extra heavy machines for industrial and sugar refining machinery and equipment. Boiler-maker and blacksmith shops. Must sell to settle estate. Will send inventory and business report on request. Address: **TALLERES AMERICA, APARTADO 2610, MEXICO CITY, MEXICO.**

FOR SALE

Gray iron foundry in central Michigan specializing in boat anchors, City of Flint manhole castings, all kinds of furnace castings, State Roadside Park Gates, Board of Education boiler grates, and numerous other jobs. Orders guaranteed. Must sell because of ill health. Address: Box 809, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOR SALE

Nonferrous French and green sand. Sales $30,000 to $50,000 yearly. Located in Brooklyn. Rental $115 monthly. Address: Box 877, FOUNDRY, New York 17, New York.

FOUNDRY FOR SALE

Fully equipped jobbing and production gray iron foundry in Central Wisconsin with daily capacity up to 10 tons. $36,000 full price. Address: Box 740, FOUNDRY, Cleveland 13, Ohio.

SMALL FOUNDRY FOR SALE

On New York Central Railroad side track in Lockport, New York. Floor space of molders approximately 11,000 square feet with exceptional dumping ground for disposal of slag and waste indefinitely at lowest expense over declivity on the land. Considerable foundry equipment thrown in for the price of assessed value of the real estate. Address: JEFFERSON UNION COMPANY, LOCKPORT, NEW YORK.

FOR SALE

Brick and steel foundry, Southern Illinois, 160 x 320 feet, overhead monorail water transportation available. Ideal for mechanized operation, contains equipment. Address: Box 702, FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

1—Used Pittsburgh Lectromelt Furnace Type C-16
Side Charge 1½ ton per hour melting capacity
Complete with 800 KVA Transformer

BAY CITY ELECTRIC STEEL CASTING CO.
BAY CITY, MICHIGAN

FOR SALE

TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
4500	16 oz.	G.E.	660	20 oz.	A-B
3500	40 oz.	Spencer	500	10 oz.	No.Am.
2800	1 oz.	Spencer	400	16 oz.	Spencer
2700	16 oz.	Spencer	400	4.3 oz.	Spencer
2500	7 oz.	Sturt.	340	20 oz.	A-B
2000	2½ oz.	Spencer	320	12 oz.	Spencer
2000	1 oz.	Spencer	225	16 oz.	Spencer
1150	20 oz.	No.Am.	180	15 oz.	Spencer
800	8 oz.	No.Am.	9100	7" SP	Sturt.
675	16 oz.	No.Am.	2344	2" SP	Clarage
			1100	4½" SP	Bayley
			100	7" SP	Spencer

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

FOR SALE

36 x 42 American Wheelabrator Tumblast
Complete with skip loader—1941
Pangborn Airblast Barrel, Type GH1
#3 with 30 x 40 barrel

WELDON F. STUMP CO.
540 WILLIAMSDALE DR. TOLEDO 9, OHIO
PHONE WA 7755

FOR SALE

1—Small pull out draw type core oven.
2—Royer Sand Conditioners.
Numerous other foundry equipment.

WRITE:
GEORGE HILLIS
3220 MIAMI
KALAMAZOO, MICHIGAN

FOR SALE

6000 lb. Herman Rollover and Draw. Will handle 42" x 60" flasks, 49" between turnover plate and draw piston equalizer.
Motive Jr. Sand Slinger, overall height 15' 8¼", 440 V 60 cycle machine, 19" ramming head, 15' ramming radius.
Both bought in 1948.

E. W. BLISS COMPANY
WESTWOOD AVENUE.
TOLEDO 7, OHIO

FOR SALE

DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb. cold metal or 2,600 lb. hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.

CHIPPING HAMMERS FOR SALE

(1) Chicago Pneumatic Simplate valve hammer, Size #1. (1) Chicago Pneumatic Boyer, size BR1. (2) William H. Keller, Inc., size 2x. These tools have never been used. $50.00 each. Address: Box 884, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

One Osborn core blowing machine model #91. Serial #12269G. If interested contact or write: **CLINTON MACHINE CO., MAQUOKETA, IOWA.**

For Sale

FOR SALE

MOLDING MACHINES
2—No. 275 Osborn jolt squeezers.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
4—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
1—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.

BLOWERS FOR CUPOLAS AND FURNACES
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.

METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.

MISCELLANEOUS
1—Beardsley & Piper, Model S Screenerator.
1—Simplicity Model B Sand Conditioning Unit, 4' x 8' double deck screens with aerator for piling.
1—Stoney crane type shakeout.
1—NC-4 Royer sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—24W Wet Type Roto-Clone 13000 CFM.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

We have purchased the complete mechanized foundry of the Maytag Company, Newton, Iowa. In order to effect the removal of this equipment, we are prepared to sell at very reasonable prices.

1—#3 Simpson Sand Muller
1—#2 Simpson Muller complete with skip loader
32—Overhead Sand Hoppers
9—Sand Belt Conveyors
2—Sand Elevators
2—4 x 8' Simplicity Shakeouts
5—Steel Plate Mold Conveyors
Complete folder on request.

RECENT PURCHASES:
4—Jeffrey Sanditioners
5—Osborn 710PJ Jolt Squeeze Strippers
4—Osborn 559 Jolt Strippers
2—Detroit Electric Furnaces
800'—Heavy Duty 24" Foundry Conveyor

UNIVERSAL MACH. & EQUIP. CO.
320 E. BROAD ST.
SHILLINGTON, PA.
PHONE READING 7-1321

TESTING MACHINES

1—Riehle 400,000# hydraulic and beam type Compression Testing Machine
1—Riehle 200,000# Universal
2—Riehle 100,000# Universal
1—T. Olson 100,000#
Also Simpson Sand Mixers 18" dia. Laboratory, #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.
OUR 36th YEAR

CONSOLIDATED PRODUCTS CO., INC.
13-20 PARK ROW NEW YORK 38, N. Y.
TELEPHONE: BARCLAY 7-0600

PATTERN EQUIPMENT FOR SALE

First quality aluminum patterns for 4" medium soil pipe fittings. Also complete set of aluminum patterns for waterless aluminum utensils. Address: **ST. JEROME INDUSTRIES LTD., CASTONGUAY ST. WEST, ST. JEROME (TERREBONNE) QUE., CANADA, TEL: 3767.**

FOR SALE

Clearfield #920 Mixer, excellent condition, Serial 205-C. Complete with motor and starter. Address: **WM. P. LAYTHAM & SONS COMPANY, 925 MARKET STREET, PATERSON, NEW JERSEY.**

For Sale

SUPER SPECIAL
FORK LIFT TRUCKS

15,000 lb. Hyster Fork Lift Trucks.
6,000 lb. Clark Fork Lift Trucks.

CORE BLOWERS

#91 Osborn, #193-4 Osborn, #94 Osborn.

WHEELABRATORS

20" x 27" American Wheelabrator.
27" x 36" American Wheelabrator.
48" x 48" American Wheelabrator.

MOLDING MACHINES

Herman Jar Rollover and Pattern Draw Machine. New in 1944; 48" x 144"—10,000# Series. Rollover Ser. No. 1812; solid cylinder jolt machine Ser. No. 4167; read discharge roller conveyor complete; No. 4 (1½") Electro Pneumatic Timing Device 115 volts, 60 cycles; 2 sets 6000# Pneumatic Flask Clamps complete with special holders (Like New Condition).
Herman Jar Rollover and Pattern Draw Machine 80" cap.; 6000# Series.
30" x 36"—#1500 Series Hi-Speed Herman Pneumatic Jar Rollover and Pattern Drawing devices with 26" x 30" plate—8½" cylinder jarring molding machine. 16" draw; max. flask size is 36" long—30" wide—16" high.
International JDP Pattern Draw Machine 600 lb. cap.; 8" draw; on wheels; table size 20" x 22".
#2047 Osborn Jolt Rollover Pattern Draw molding machines.
#601—13 Osborn Jolt Rollover Pattern Draw molding machines.
#405 Osborn Rollover molding machine, 79" table.
#413-3 Osborn Jolt Rollover Pattern Draw molding machine; 130" x 42".
Osborn #275 J Jolt Squeezers.
SPO Model 914 Jolt Rollover.
#1 Johnston & Jennings Jolt Squeeze Strip molding machine.
#146-2 Milwaukee Jolt, Squeeze, Strip, Roll-on, Roll-off molding machine with power swing arm. Max. flask size 18" x 30" x 8". New in 1952.
SPO #3058, special jolt, pin stripping molding machine with 23" x 27" table, pins adjustable 14" to 22" x 19" mounted on wheels.

MISCELLANEOUS

Stroman Aluminum Furnace—reverberatory type; 1200 lb. cap.; gas fired; with skip hoist and hydraulic tilting equipment.
Beardsley & Piper Tractor Type Sandslinger—with magnetic tower—13' arm.
#404 Clearfield Mixer.
Marschke Swing Frame Grinder—10 HP.
Beardsley & Piper Screenerator.
#6 Whiting Cupola Blower.
#2 Climax Wire Straightener.
#2 Simpson Muller
#7 Cupola. Still in crate.

FOR THE BEST DEAL
CALL
BALCHER MACHINERY COMPANY
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO
TELEPHONE: FAIRMOUNT 1-1186

FOR SALE

2500 KVA TRANSFORMER WITH TAP CHANGER

Oil-insulated, water-cooled Westinghouse Transformer designed for electric steel furnace operations. Indoor type, 3-phase, 60 cycle, primary 13,200 V. Separate GE Reactor with hand operated tap changer gives secondary voltages on YY connection of 96, 104, 112, 122, 125, 134, 153, 172; on AY of 166, 179, 193, 211, 217, 239, 265, and 298 V. Complete with 1800 gallons oil. Both units A-1 operating condition, guaranteed to pass standard NEMA tests.

BOX 861
FOUNDRY CLEVELAND 13, OHIO

FOR SALE

1—Milwaukee Jolt Rollover, Model No. 60-B-4, Serial No. 12471, Table size 30" x 60". Machine used only six months. Available for immediate delivery. Wire, Phone or Write:

SOUTHERN CAR & MFG. CO.
400—7th ST. SO. BIRMINGHAM, ALABAMA
TEL: 4-1714

FOUNDRY EQUIPMENT

MOLDING EQUIPMENT

Herman Jolt Rollover # 6000, 40" x 60", 1947
2—Herman Jolt Stripper, 48" x 54", 1947

Osborn Jolt Roll Over, model 405S, with Roll out Car 44" x 48"

2—275 J Osborns
1—75J Osborn
3—SPO Squeezers 110J
29—2047-4 Osborns Jolt & Draw
8—Tabor Split Pattern Squeezers
5—Haynes Squeezers
2—Adams 12 x 38 Squeezers
1—Milwaukee Squeezer
1—#332 Osborn Jolt Rollover
2—Int'l. Portable 24 x 30 Rollover
1—Tabor 31 x 40 Rollover

SAND HANDLING EQUIPMENT

Unit A Syntron Feeder Hopper, 6' x 6'
2—Aerator, Overshot type, 9' x 2' & 4' x 3'
Aetna Sperser System
Simplicity Shaker, model C
Belt Conveyor Systems
1—B & P Mulbaro

CRANES & HOISTS

15—Curtis Traveling Bridges, 15' span
16—Curtis Air Hoist, 5 & 6" Cylinders, 3½' x 4' Lifts
Electrified Monorail

CUPOLA & LADLE EQUIPMENT

1—Whiting Blower 3900 CFM at 20 oz.
Roots Connersville Blower, 22 x 66, 50 hp
North American Centrifugal Blower, 3000 cfm
Spencer Turbo Blower, 3500 cfm @ 40 oz.
Spencer Turbo Blower, 2250 cfm @ 16 oz.
2—#9 Whiting Cupolas
Geared Ladles—1 ton to 4 ton—tilt.

MISC. FOUNDRY EQUPT.

50" dia. Muller, single wheel
1—Schramm 25 hp Air Compressor
10,000 ft. #458 Chain Conveyor with Trolleys
Brinell-Rockwell-Riehle Testers
2—Int'l SB11 Core Blowers
Demmler #1 Core Blower
1—12 x 12 Pangborn Sand Blast Room, with Dust Collector
1—400# Detroit Electric Furnace
2—6000# Automatic Transporters
Baker Lift Truck, 6000# cap., 1948
Yale Lo Lift, Redi power
300 ft. 10" Logan Roller Conveyor 3½" Dia.
Logan Wood Slat Conveyor, motorized, 36" x 35' Roller Conveyor
15—Double End Grinders
#124 Gardner 53 Horiz. Grinder
1—U. S. Double End Grinder—Late
1—Standard Buffer & Polisher—Late
Tons of Flasks
Core Blower, Champion, model CB400, 300 lb.
1—Roto-Clone unit, 24W, with sludge ejector
2—48 x 72 Jeffrey Vibrator Feeders
Vibrators, Osborn, 1⅝" x 2"
1—McLeod Tumbling Barrel
4—Whiting 30 x 60 Tumbling Barrels—late
2—Sand Cutters Model M
Bottom Dump, Sand Buggies
Exhaust Fans—to 60"
Exhaust Blowers—all sizes

WE WILL BUY—FROM 1 PIECE UP TO ENTIRE FOUNDRY

GREENE BROTHERS
(FORMERLY ASSOCIATED WITH ALLIED MATERIALS HANDLING CO.)
511 FREEMAN AVE.
CINCINNATI 3, OHIO
Phone: MAin 2192

For Sale

CLOSE-OUT SALE
FOUNDRY EQUIPMENT

We have the following foundry equipment FOR SALE:

Quan.	Machine & Manufacturer	Size
1	Molding Machine R.J. (International)	20"x12"
3	Molding Machine, Hand Draw (International)	14"x8"
1	Molding Machine, Foot Draw (International)	24"x10"
2	Molding Machine (International)	20"x8"
1	Molding Machine (International)	60"x8"
1	Molding Machine, Squeezer (International)	14"
6	Jolt Squeezer, Portable (Milw. Foundry Equip.)	26"
7	Jolt Squeezer (Milw. Foundry Equip.)	21"
1	Screen (Simplicity)	3'x6'
2	Core Blower (International)	
1	Dry Grinder, Horizontal Disc. (Chas. Besley Co.)	53" Dia.
1	Ventilating Fan & 20 HP Motor	
1	Ventilating Fan & 25 HP Motor	
1	Ventilating Fan & 10 HP Motor	
1	Sand Mixer Core (Blystone Div., Standard Sand & Mech.)	
1	Sand Cutter (American Foundry Equip. Co.)	74/50"
1	Air Hoist (Independent Pneumatic Tool Co.)	1 Ton
1	Tumbling Mill (W. W. Sly Mfg. Co.)	
1	Dust Collector (Rumlein)	

WRITE FOR INFORMATION

GEHL BROS. MFG. COMPANY, ROOM 9
WEST BEND, WISCONSIN

FOR SALE

Whiting Cupola, #6B. Serial 5730, Lined to 48".
Roots-Connersville Blower. 16x42. Serial 17343, 50 H.P. 1200 Motor, 3 Ph, 440 V, 60 c.
Foxboro Air Weight Controller, M10. Serial F 51786.
Jeffrey Apron Conveyor. Serial 1237420.
American 8' Rotary Cleaning Table with Pangborn gut blast machine, #AU11, No. DVR7, Seperator and No. IC3 Elevator.
2 American Sandcutters. Model D-1, #D641 and Model M-89/70, No. M267.
Whiting Cupola, #8.
2 Roots-Connersville Cupola blowers with V-Belt drive, 50 HP motors and Foxboro air weight controllers #M10-F39645.

HOLLAND FURNACE COMPANY
HOLLAND MICHIGAN

FOR SALE

DUE TO CHANGE IN OPERATIONS, NEWAYGO ENGINEERING COMPANY "REDDY SANDY" ON PERMANENT SUPPORT LEGS, WITH AERATOR, WATERING DEVICE, VIBRATING SHAKEOUT AND SCREEN. SEVEN FOOT CENTERS. OVERALL LENGTH TEN FEET. VOLTAGE 220-60-3. MODEL RS-V. SERIAL RS-1127. USED LESS THAN THREE MONTHS. COST $2,520.00. SALE PRICE $1,500.00. ADDRESS: PETER HEALEY BRASS FOUNDRY COMPANY, P. O. BOX 834, EVANSVILLE 1, INDIANA, PHONE 57801.

FOR SALE

Jolt Squeeze Machines in good operating condition. Priced for quick sale.
8 Milwaukees
8 Arcades
5 Osborns

WRITE:
C. T. JONES, PLANT ENGINEER
GUNITE FOUNDRIES CORPORATION
302 PEOPLES AVENUE
ROCKFORD, ILLINOIS

FOR SALE

Model #92 Osborn Core Blower, air clamped. Equipped with 2 blow-heads: 1—22" x 12" sand reservoir blow plate surface, 11" sand reservoir; 1—12" x 10" sand reservoir blow plate surface, 12½" sand reservoir.

DUPLEX MFG. & FOUNDRY CO.
398 W. RIVER STREET
ELYRIA, OHIO
PHONE: 2353

FOR SALE

The following equipment in excellent condition has just been declared surplus by a very large concern with reputation for fine maintenance:
1—Pangborn 8' Rotary Table, type LD-1
2—Pangborn Rotoblasts 2S GKA complete with skip loaders
1—#40 Speedmuller
2—Clearfield #920 Mullers with 60 HP motors
1—30" Tannewitz band saw
1—DeWalt 10 HP cut-off saw.

BOX 887
FOUNDRY CLEVELAND 13, OHIO

For Sale

CALL US COLLECT FOR YOUR REQUIREMENTS ON:

MOLDING MACHINES
Osborn, Milwaukee, International, Spo, Herman or Specials.

MULLERS

Simpson, Beardsley & Piper

SHOT BLAST EQUIPMENT

Pangborn, American Wheelabrator

SAND CONDITIONING EQUIPMENT

Royer, Beardsley & Piper, American Wheelabrator

SAND HANDLING SYSTEMS

GRINDERS

ELEVATORS

AIR COMPRESSORS

HOISTS

SHAKEOUTS

CORE OVENS

FURNACES

We also **BARTER** to give you what you want for your Surplus.

ALL EQUIPMENT SUBJECT TO RETURN IF UNSATISFACTORY.

LAND-WHITEHEAD EQUIPMENT CORP.
FOUNDRY MACHINERY SPECIALISTS
P.O. BOX 939 READING, PA.
PHONE: 5-4379

ATTENTION

Interested in larger or newer Sand Blast Equipment? Get our estimate on your present equipment against:
48 x 42 Wheelabrator Tumblast $3,000.00
Eight ft. Wheelabrator Air table.
LG-4 9 ft. Wheelabrator Table Blast with auxiliary tables and two throwing wheels.
7GK-2 Pangborn Rocker Barrel, good condition $2,500.00
3Y-2 GK2 Pangborn Rocker Barrel, good condition $2,500.00
Also hand cabinets, dust collectors and pressure tanks.

DIAMOND SAND BLAST, INC.
5654 W. Jefferson
Detroit, Michigan

FOR SALE
NEWAGO UNITS (NEW 1953)

One twin overhead hopper Handy Sandy with air operated hydraulic sand gates.
One elevator tower with aerator.
One feeder hopper with conveyor belt to elevator tower.
One Reddy-Sandy shakeout unit with moistener and aerator delivering condition sand to feeder hopper.
One #1 Demmler core blower.

FOUNDRY SUPPLY COMPANY, INC.
5009 EXCELSIOR BOULEVARD
MINNEAPOLIS 16, MINNESOTA

FOR SALE

Motors, Generators, Transformers from 1 HP to 2500 HP
World headquarters for T.E.F.C. and explosion proof motors.
World's largest inventory.

ELECTRIC EQUIPMENT CO.
ROCHESTER, N. Y.

FURNACES FOR SALE

Ten used heat treating furnaces and two seven ton gantry cranes. Good condition. Priced to sell. Address: **BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.**

FOR SALE

AIR COMPRESSOR

Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm synchronous motor, 350 CFM at 100#.

BLOWERS

Spencer Turbo Blower, 2250 CFM at 16 oz. 15 HP 3/60/220 totally enclosed motor. New 1947.

Ingersoll Rand Motor Blower Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220 V. G.E. Induction Motor.

Buffalo 7E Direct Connected Blower, 50 HP Westinghouse motor, 3/60/220-440 V, 3535 rpm, 28" wheel, 3500-4000 CFM at 32 oz. Flanged outlet.

CONVERTER

100 KW Rotary Westinghouse 220 V 60 cycle primary 250 V DC, complete with controller and panel.

CORE BLOWER

Demmler #3E Dropaway Draw. New 1946.

CRANES

5 Ton P & H Overhead Elec. Traveling Crane, 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.

5 Ton P & H Overhead Electric 20'5" span, electric hoist, hand travel both ways, P/B control 440 V A.C.

10 Ton Northern Overhead Elec. Traveling Crane, double girder, fish belly, 3 motors, 230 V D.C., 54'7½" wide C to C of wheels can be cut down to fit smaller size.

CRUSHERS—PULVERIZERS

2—Stedman 15" x 12" Type A. One with 10 HP 220-440 V motor. One without motor.

7—Prater Blue Streak Pulverizers, 30 HP motor.

ELECTRIC FURNACES

Detroit 350#, Type LFA 230 KVA transformer 13,200 primary volts.

Electromelt Type C, side charge. Late type transformers. Can be seen in place.

Detroit 1200# Electric Rocking Type Furnace, complete with transformers.

2—Bailey (Electric Furnace Co.) 75 KW Electric Arcy type side electrode tilting furnaces and transformers.

FIRE EXTINGUISHERS

St. Regis Model 181 Dry Powder for magnesium fires.

Buffalo 50 gal. soda-acid cart type.

FORK LIFTS

Baker 6000# Gasoline Fork Lift Trucks, KMH60, 120" lift, 88" collapsed height, 42" forks, solid tires. Rebuilt-Guaranteed.

Ross Fork Lift Truck, 19 HT, high lift, 6000# capacity, 14' lift, 48" forks. Pneumatic tires. Rebuilt-Guaranteed.

GRINDERS, DISC

Besley 208 Double End 26" x 2¾" wheel with 2 compound tables, V belt drive, 15 HP, 220-440 totally enclosed motor, magnetic starter controls.

2—U. S. Model 80 Double End 2-18" dia. wheels, 7½ HP motor, 2 swinging tables 8" x 14"—1 with hand lever feed.

GRINDERS, SNAGGING

McCabe 2" x 24" wheels, 48" between wheels, 3/60/440 V.

Ransom SB Double End 2" x 20" wheels, 220 V motor, p/b control.

1—Hammond type 20 WR2—3" x 24" wheel, double end grinder, single speed, 20 HP Louis Allis Squirrel Cage, 220-440 V—1760 rpm motor.

2—Norton Type D, 3" x 24" wheel, 66" between centers, flat belt drive.

GRINDERS, SWING

Fox 10 HP 3/60/220 V Swing Frame, 2 speed.

U. S. 15 HP, 3/60/440 V Swing Frame, 2 speed.

Fox 15 HP Swing Frame, 2 speed.

Marschke 20 HP, 2 speed.

HOISTS

500# American LoHed.

1000# Cleveland 220/440 V.

1000# Detroit 220/440 V.

5—1000# P & H Hevi Duty with trolley.

2—2000# P & H Hevi Duty with trolley.

2000# Detroit Electric.

2000# American LoHed.

11—4000# P & H Hevi Duty with trolley.

2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.

2—5 Ton Air Hoists with motor driven trolleys.

LADLES

3 Ton Whiting Mixing Ladle on wheels.

1 Ton Enclosed Gear Crane Ladle truck type, 4 wheel car for 18" gage track, Whiting Junior.

1 Ton Whiting Standard enclosed gear crane ladle, truck type, 4 wheel car for 18" gage track.

1—20½" Top Whiting Enclosed Gear Ladle.

MOLDING MACHINES

2—Champion Pin Lift Pushoffs, 44" x 44" x 12" draw.

2—Champion Pin Lift Pushoffs, 46" x 46" x 12" draw.

1—Champion Jolt Squeeze Strip Molding Machine, column type, 12" jolt cylinder, 8" lift, 18" x 21" table.

2—Champion Hand ram, hand clamp, hand rollovers 26" x 14" table.

3—Champion Hand Ram, Hand rollover, Hand draw core machines, 15 x 15 bed.

3—Davenport Portable Jolt Rollover Pattern Draw 20" x 24" tables, open end, 8" draw.

1—International Type G 20 x 8 Power Rollover Power Jolt Hand Draw, 30" x 18" table, 8" draw.

1—International Type G 24 x 10 Jolt Rollover, foot draw, 22 x 30 table, 10" draw.

1—International Type G 30 x 12 Jolt Rollover Foot Draw, 28" x 36" table, 12" draw.

1—International Type G 30" x 30" table, 9" draw, Portable.

2—International Type G 18" x 56" table, 8" draw. Portable.

1—International Type F Jolt Rollover 27 x 12, 12" draw, 35" x 26" table.

1—International Jolt Rollover Pattern 10" Draw, 22" x 30" plate, 6" jolt cylinder.

1—International Plain Jolt Molding Machine 48" x 60" table, no pit required.

1—Herman Jolt Rollover Pattern draw, 40" x 84" table, slotted nickel alloy table over regular table to accommodate various sized flasks, air clamp, new 1946. Used very little.

1—Herman 20" x 30" rollover pattern draw, 750# series. Air clamp.

2—Herman 20" x 24" Jolt Rollover Pattern Draw, 750# series. Air clamp.

1—Herman 4000# Series High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.

2—Milwaukee Arm Type Jolt Squeeze Strippers, 1500# capacity, Model 163-50 Serial 13104-5, 15" x 24" table, 16" x open end, pattern size. Late type.

1—Osborn 76J Portable Jolt Squeeze Molding Machine 12" cylinder.

3—Osborn Jolt Squeeze Molding Machines, 16 x 20 table, tilt back head.

2—Osborn 405 Jolt Rollover 40" x 70", 2000# capacity, 20" x 60" jolt table and 4 wheel receiving car.

1—Osborn Portable Jolt Rollover Pattern draw, 900# capacity. Model 601-13. 30" x 24" flask size, 10" draw.

1—Tabor 1000# Rollover, 30" x 60" table.

MULLERS AND MIXERS

Simpson #2 Motor on base, bucket loader.

Simpson #3 Motor on base, bucket loader.

Simpson #3 Type H open gear type.

Simpson #3 Open Gear Type.

American Model M Sand Cutter, 70" blades.

Clearfield 404—5 HP motor.

Kwick Mix Paddle Type.

ROTOBLAST

Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SHAKEOUTS

1—3' x 5' Link Belt.

2—4' x 6' Simplicity.

SPEED REDUCERS

Cleveland 408-R1, 36 to 1, 20.5 HP.

Falk Motoreducers 7½ HP.

U. S. Syncrogear Motors 7½ HP.

U. S. Syncrogear Motors 5 HP.

TESTING MACHINE

Tinius Olsen 60,000# Standard "L" Type Testing Machine with electronic recorder and transverse tools. In excellent condition.

TUMBLING BARRELS

Whiting 30" x 48"

Whiting 48" x 60"

WIRE STRAIGHTENERS

2—Climax 1 HP motor.

1—Kane & Roach 3 HP motor.

ACME EQUIPMENT CO., INC.

WE WILL BUY FOR CASH A SINGLE PIECE OF EQUIPMENT OR YOUR ENTIRE FOUNDRY

126 South Clinton Street Phone: Andover 3-3430 Chicago 6, Illinois

FOR SALE

Molding Machines

1—Link-Belt "Merry-Go-Round" Roller type mold conveyor complete with 35 cars 38″ x 72″
2—6000# Herman Jolt Rollover & Pattern Draw
2—#405-95 Osborn Jolt Rollover & Pattern Draw, 26″ draw
2—SA34 Davenport Jolt Rollover & Pattern Draw
1—SA28 Davenport Jolt Rollover & Pattern Draw
1—SA24 Davenport Jolt Rollover & Pattern Draw
2—30″ x 40″ Tabor Jolt Rollover & Pattern Draw
2—22″ x 32″ Tabor Jolt Rollover & Pattern Draw
4—814-P Osborn Jolt Squeeze Pin Lift
2—2114 Portable Jolt Squeeze Pin Lift SPO
2—#815 J & J Jolt Rollover & Pattern Draw
1—34AJS Jolt Stripper, 12″ draw, 2500# jolt
1—#307 SPO Jolt Stripper like new
2—Herman Jolt Strippers 40″ x 60″ table
1—Osborn Jolt Stripper 3′ x 16′ table
2—International Type JFL Jolt Ram, foot-lever, pin-lift
3—International Type R Hand Rollover
Jolt Squeeze Molding Machines—SPO—Osborn, Tabor, Modern

Furnaces & Blowers

7—1000# Fisher Type "MNP" electric tilting, crucible type, Nose pouring, gas fired, 4 burners
1—500# Hausfeld Hand tilting
1—Stroman #14 non-tilt
1—Cupola blower—Spencer Turbine 50 HP 220/440/3/60 16 oz.
1—Cupola blower—North American 20 HP 220/440/3/60 24 oz.
2—Furnace Blowers—3 H.P. 220/440/3/60 16 oz.

Core Blowers

1—#3E Demmler—weight of core up to 35 lbs.
1—#2K Demmler—weight of core up to 20 lbs.
1—#1 Demmler—weight of core up to 10 lbs.
6—#92 Osborn—weight of core up to 35 lbs.
3—Redford Bench type cartridge up to 2 lbs.

Sand Mullers

1—#3 Simpson 30 cu ft capacity. Model H Style E
1—#610 Clearfield 14 cu ft capacity under drive, with motor
2—#70 Beardsley-Piper 18 cu ft per batch
1—22″ x 78″ Link-Belt Paddle type
1—Link-Belt Pugmill 42″ x 96″

Shake-outs

1—4′ x 6′ Simplicity Model D 16000# cap., 10 H.P. 220/440/3/60
1—4′ x 6′ Robbins 8000# cap.
1—4′ x 10′ Robbins, 12000# cap., 7½ H.P. 220/440/3/60

Sand Slingers

2—16″ head Beardsley-Piper Stationary 10 H.P. 220/440/3/60

Grinding Equipment

2—Fin Cleaning Machines for cylinder heads—Ireland
1—#30 Gardner double end disc grinder, V-belt driven
1—#6 Cheesly disc grinder dir. conn. 18″ wheel
1—10 HP Black & Decker dble end 20″ x 3″ wheels 220/440/3/60
2—7½ HP Safety Emery Wheel dble end 18″ wheels 220/3/60
4—5 HP Safety Emery Wheel dble end 18″ wheels 220/3/60
1—3 HP double end grinder, flat belt driven 220/440/3/60
1—7½ HP Universal Swing Grinder 220/440/3/60

Cranes & Hoists

1—40′ overhead bridge crane, 3 ton capacity, cab operated 220/440/3/60
1—30′ span hand travelling bridge crane
1—20′ span hand travelling bridge crane
3—12′ span hand travelling bridge crane
6 Louden Monorail systems
Ingersoll-Rand airhoists 1000# to 6000#
Electric Hoists ½ ton to 1 ton

Air Compressors

1—40 HP Ingersoll-Rand single stage horiz. 220/440/3/60
1—150 HP Ingersoll-Rand two stage horiz. 220/3/60
1—50 HP Gardner-Denver single stage horiz. 220/3/60
1—100 HP Worthington-Laidlow single stage horiz. 220/3/60

Misc. Foundry Equipment

1—Atlas Car & Mfg. Co. Car scale
2—Charging cranes for cupolas, Shepard 3 ton cap. D.C.
1—Uni-Wash Newcomb-Detroit Wet dust collecting system
1—Pigmold conveyor 64′ centers, Link-Belt
1—6500# Toledo Floor scale
12—Whiting and Modern Pouring ladles, 350# to 1800#
100′—24″ Belt Conveyor, frame, troughing idlers, drives, etc.
2—#3 Jeffrey electric vibrators
4—#4 Jeffrey electric vibrators
1—2 compartment Coleman Core Oven, 6′ x 8′ doors
1—2 compartment Rybolt Core Oven, 4′ x 6′ sliding doors
1—single compartment Rybolt Core Oven, double door
8—Cleaning cabinets for magnesium with exhausters & motors
1—8′ dia. American Wheelabrator Tablast complete
Roller conveyor above rail, 14″ to 36″ in width
1—Impregnating room fully equipped
1—Blaw-Knox Clamshell bucket size 308-F
1—Link-Belt aerator with drive complete
2—1000 Gals. p. Min. Centrifugal Pumps, I-R., 30 HP 220/440/3/60
1—Link-Belt Core Breaker Drum 6′ x 10′
1—Revolving Core conveyor table—Bush-Lawrence

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 Saranac Rd., Cleveland 10, Ohio — Telephone: Glenville 1-1222, 1-1538

SEASON'S GREETINGS AND BEST WISHES FOR THE COMING YEAR!

MOLDING MACHINES

1—Herman 5' x 8' Core Mold Stripping Machine, hydraulic, unison channel type, 2 cylinder, capacity 24,000# at 80# pressure.
1—HERMAN PNEUMATIC 40" x 60" 15" Solid Cylinder Jarring Molding Machine, Heavy duty Bumper Type. Equipped with No. 12-15 Des. 2 Bumper control valve.
5—S P O No. 110J Portable Jolt Squeeze Machines, complete inverted Jolt. Cantilever type Squeeze Head. 1952 machines.
1—S P O No. 507 Rollover, Jolt Pattern Draw.
6—OSBORN #275J, Jolt Squeeze Machines, portable & stationary models.
1—Osborn #710PJ, Squeeze Machine.
4—Osborn #814-P, Jolt Squeeze Strippers.
1—Osborn Model 413-3 Osborn Jolt Rollover Pattern Draw, Table length, 130", table width 42", draw 27", Jolt capacity at 80# air pressure—12,000 lbs, jolt cylinder diameter 23", 1942 machine.
10—**OSBORN** #559 HD Jolt Strippers, stationary, Table 25" x 30", Jolt 1200 lbs. cap.
1—Osborn #333 H Jolt, Squeeze, Power Rollover, Pattern Draw, 2000 lbs., Jolt, 22" x 44" Table Jolt Cylinder 12", Draw 22".
2—Osborn #332 Jolt, Squeeze, Rollover, Pattern Draw, Draw 9", Flask Size 25" x 36".
1—Osborn #816 Jolt Squeeze Stripper, Squeeze Cylinder 16", Jolt Cap. 1000 lbs.
6—Osborn #2047 Jolt Rollovers, 8½", Draw, Flask Size 22" x 16" x 10⅛" deep, 600 lbs.
5—Osborn #601-13, Jolt, Rollover, Pattern Draw, 600 lbs. cap., Flask Length 30".
2—Osborn #405, Jolt, Rollover, & Pattern Draw, Flask Size, 64" x 57", Jolt Cap. 3000 lbs. 1946 machines.
2—Osborn #331 Jolt Rollover, Squeeze and Pattern Draw, Squeeze cylinder Diameter 13", Table Length 30".
6—Osborn Jolt Squeezers #75J, Serial #6277Y.
1—**JOHNSTON & JENNINGS** Model 918, Jolt Rollover and Pattern Draw, Table Size 44" x 54", 20" Draw.
1—Johnston & Jennings Jolt Squeeze Machine.
2—Johnston & Jennings #815, Jolt Rollover and Pattern Draw, Table 30" x 40", Pattern Draw 15". Cap. 1200 lbs.
1—Johnston & Jennings Model 812S Stationary Jolt Pin Lift, table size 30" x 38", draw 12" capacity 1600 lbs.
1—Johnston & Jennings Model 1216S Stationary Jolt Pin Lift, table size 36" x 54", draw 16", capacity 3000 lbs.
1—Johnston & Jennings Air Jolt Machine, 14" x 20" table size, 3" cylinder.
3—**INTERNATIONAL** Model PKL, Jolt, Squeeze, Air Pin Lift Machines, 18" x 24" Table, Lift 5½", Squeeze Cylinder, 12".
1—International Pushoff Stripper, 42" x 26" table, 6" Draw.
5—International Type "R" Hand Ram, Hand Turnover, Foot Draw Machines.
2—International Type "RJ" Jolt Ram, Hand Turnover, Foot or Hand Lever Draw Machines. Various Sizes.
3—International Type JFL, Jolt Ram, Foot Lever, Pin Lift, Various Sizes.
2—International Type RES, Jolt, Squeeze, Rollover, Draw Machines, 15" x 8".
4—International Type G, Air Jolt, Air Turnover Foot Draw Machine, 20" x 8", 30" x 8".
1—International Type LJSD — 14, Jolt Squeezer—Double Squeeze Head, 16" x 20" table.
1—Champion Jolt Squeezer, Portable, Size JS-10-P. Serial #5770, Table Size 18" x 21".
1—Champion Power Jolt, Hand Turnover, Foot Draw Machine, 13" x 17" table Model #JM 16, Serial #5092.
2—**DAVENPORT** Model SA-34, Jolt Rollover and Pattern Draw, 2500# Jolt Cap., 15" Draw, 34" x 48" Table, Flask Max. 36" x 64".
1—Davenport Model 28, Jolt Rollover, and Pattern Draw, 1500# Jolt Cap., 12" Draw, 30" x 40" Table.
2—**TABOR** Jolt Rollover and Pattern Draw, Draw 10", 600 lbs. Cap.
2—Tabor, Hand Rollover, Hand Jolt Machines.
1—Tabor Jolt Rollover Pattern Draw, 30" x 40" Table, Draw 12", cap. 1000 lbs., Maximum length of pattern 53", minimum length of pattern 20", height of flask 20½".
3—**MILWAUKEE** Model 123-13, Jolt, Squeeze, Machines, 12" cylinder, 17" x 26" table.

GRINDING EQUIPMENT

2—Fox No. 3-A High Speed Stand Grinder. Wheel size 20" x 2" x 10", 5 H.P. motor.
1—Hammond Model WR-1 Double End Snagging Grinder, 7½ H.P., 220/440/3/60.
2—Hammond Model WH-10 Double End Grinders with (2) 7½ H.P. 220/440 3 phase, 60 cycle, wheel size 20" x 2" x 2".
4—Mummert Dixon Swing Grinders, Model No. 2016, 10 H.P., 220/440 volt motor, wheel size 20" x 3" x 10".
1—Queen City Model 100 Double End Disc Grinder with 10 H.P. 220/440 Volt Motor, Size 20" x 2" x 2". Very Late Machine.

SAND EQUIPMENT

1—Beardsley & Piper Model L Screenerator, on pneumatic tires, Portable.
1—Beardsley & Piper Sand Conditioner, complete with magnetic separator, 20 H.P. totally enclosed motor, overhead hopper, largest model made. Serial Number SC-73, 1945 machine.
1—ROYER Model NB-2 Sand Conditioner, portable, steel wheels, capacity, 7 to 9½ tons per hour.
1—Royer Model NC-4 Sand Conditioner, portable, steel wheels, capacity, 12 to 15 tons per hour.
1—Royer Model NDS, Sand Conditioner, stationary, capacity, 20 to 25 tons per hour.
1—Royer Model C-2 Sand Conditioner, portable on steel wheels, 25 to 30 tons per hour.
1—Jeffrey Type "P" Sand Conditioner, Class B Mixer, Portable Type, Serial #377.
1—American Sand Cutter, Model AM, Size 69 x 45, 1945 Machine.

OIL FIRED CONVERSION EQUIPMENT

1—Oil-fired Hauck Burner No. 781, complete with controls, air heater.

MELTING FURNACES

3—Fischer Tilting Furnaces, 2000 lbs capacity in Aluminum, 1500 lbs. for magnesium, complete with NEW POTS, blowers, and electrical tilting mechanism. Offered at TREMENDOUS SAVINGS.
5—500 lb capacity Holding Furnaces, newly bricked.
1—Holding Furnace, 300 lbs. Cap.
1—Hausfeld, Tilting Furnace, 500 lbs. Cap. Nose Pouring.

HEAT TREAT FURNACES

1—Eclipse Gas Fired Furnace, 4 burners, 18" x 20" x 60" inside dimensions, with motors and blower, 1944 Machine.
1—American Gas Furnace Model DC, 10" x 16" x 26" inside dimensions, 1600 degrees to 2350 degrees F.

ELECTRIC FURNACE

1—Detroit Electric Furnace, Type LFY, 175 KW, 700 lbs., serial No. 177K for melting ferrous and non-ferrous alloys. (Never uncrated.)

MULLERS

1—Simpson #2 Sand Muller. Complete with motor & drive. Open Gear Type.
1—B & P Mullbaro #3½ with 4 Barrows.
1—Simpson #3 Sand Muller, Open Gear Type.
2—Beardsley & Piper #70 Speed Mullers.

SAND SLINGERS

B & P 16" Head 4" Tip, 10' Arm. Double Belt model with plate feeder. Ser. #425.
3—Beardsley & Piper Stationary Sand Slingers, 16" Head.

CORE OVENS

1—Coleman Core Oven, gas fired, 4 doors opening into single compartment, 42" wide, 50" high, and 31" deep, adjustable trays on 3" centers.
1—Coleman Core Oven, Gas Fired, 15' x 10' x 8', drawer type.
1—Young (3) Compartment Pull Drawer Oven, FOR MAGNESIUM, each compartment 6'6" wide x 5'9" deep, x 7' high inside (3) Drawers to compartment. Electric heating for temperature of 800°. FOR HEAT TREATING, DRAWING OR STRESS RELIEVING.

CORE BLOWERS

1—Osborn #91 Core Blower, Serial 10050—F.
2—Osborn #92 Core Blowers, Serial #9703A & 8692-C, Air Clamps.
1—Demmler #3—E Core Blower.
1—Demmler #2 Core Blower, Air Clamps.
2—Redford Core Blower No. 1, Cartridge Bench Type.

SAND BLASTING EQUIPMENT

1—American Wheelabrator Tableblast, Model BM 6350, complete with shot return and dust collector, Serial Number A 40579—12—8" Tables.
1—Pangborn Air Blast Cabinet, Model EN2, Size 5' x 3' x 7'1" high, with Dust Collector.
1—Tumbling Barrel 28" diameter, 40" long, equipped with Motor, Speed Reducer.
1—Pangborn Rotoblast Rocker Barrel Cleaning Machine, Model #28, type GK-2, cap. 28 cubic feet per charge, with loader and electrical equipment.

LADLES AND POURING DEVICES

2—Modern Equipment Co., Serial No. 2725 and 2664, F6000 Model F pouring device 3'—0" lift (F 5030) with F1730 handwheel 30" diameter and F35 yoke.
2—15" Taper covered Ladle with No. 1 type shank HS-7, R. B. T's and detachable bail without crane hook eye.
1—Whiting Ladle 20 tons, tilting, totally enclosed gearing, nose pouring.
1—Whiting Ladle, 2 tons, tilting, totally enclosed gearing, nose pouring.
1—Barrel type Pouring Ladle, 300 lbs. cap.
2—Ladle Hoists, Hand Operated, 500 lbs. cap.

CONVEYORS—Apron • Roller • Belt

1—12' Powerized Belt Conveyor, 24" belt.
1—18" x 24' Apron Conveyor, Steel Link Belt, complete with motor and drive.
1—24" x 20' Apron Conveyor, Steel Link Belt.—Less motor and drive.
1—Pig Mold Conveyor (Link Belt) 74' long, with drive, for aluminum and magnesium.
1—Plug Mill, 42" x 96", Link Belt.
80'—24" Above Rail Roller Conveyor, 1½" Rollers, 8" centers, in 10' sections.
16—Section 11' wide x 10' long, 1¼" x 3½" steel channel sides, 2" diameter x 8" long.
3—Sections 11" wide x 5 ft. long, 1¼" x 3½" steel channel sides 2" diameter x 8" long.
4—Sections 11" wide x 5 ft. long, 1¼" x 3½" steel channel sides 2" diameter x 8" long.
6—Sections 17" wide x 10 ft. long, 1¼" x 3½" steel channel sides 2" diameter x 14" long.
2000'—Matthews Gravity Roller Conveyor 20", above rail, 2½" rollers on 3" and 4" centers, heavy duty. (Like New).

LIFT TRUCKS

2—Baker Raulang Electric Fork, 4000 lbs. cap., 119" lift, Used 1 mo. Like New!
1—Automatic Platform Lift Truck, 3000 lbs cap. lift 6', battery operated.
5—Lewis Sheppard 4000 lbs. cap., Jack Lift Trucks, hydraulic, 1950 models, 28" x 40", will take 10", 11" or 12" skid.
1—Ready Power Unit, 6 cylinder, 36 volts.
1—Automatic 10,000 lbs. platform Low Lift with Ready Power Unit.

SHAKEOUTS

Simplicity Shakeouts, 3' x 3', Serial #33—SOS—106, Model S, 1000 lbs. Cap.
1—Simplicity Shakeout, 4' x 6', Model D, 16,000 lbs. cap., 10 H.P. Motor.
1—Simplicity Shakeout, 5' x 7', Serial #57—SOBG—185, Model BG, 5000 lbs. Cap.
1—Simplicity Shakeout, 4' x 6', Serial #46—SOB—145, Model B.
2—Simplicity Shakeouts, 4' x 8', Serial #48—SODE 104, Model DE, 16,000 lbs. cap.
1—Robbins 4' x 10', Floatex Model, Serial F-609, with 7½ H.P. motor & V-belt Drive.

AIR HOISTS

2—Ingersoll Rand, Size D, 4000 lbs. cap., complete with low overhead trolley.
2—Ingersoll Rand, Size E, 10,000 lbs. cap., complete with low overhead trolley.
1—Ingersoll Rand, Size C, 2000 lbs. cap.
1—Little Giant, Model A, 1000 lbs. cap.
4—Thor Pneumatic, 1000 lbs. cap. low head room.

Always in the Market for Used Foundry Equipment, One Piece Or a Complete Foundry.

A.A.A.

MACHINERY & EQUIPMENT CO.

856 EDDY ROAD—CLEVELAND 8, OHIO

Phone: Liberty 1-6545

(Licensed Auctioneers, Specializing in Foundry Liquidations)

Hines, Adams & Fremont Flasks & Jackets, Both Pop-Off & Slip. Send for Flask & Equipment Listings.

FOUNDRY

BUSINESS STAFF

GEORGE A. POPE, *Business Manager*
MARY JANE KIMPEL, *Advertising Service*

New York ..... J. F. AHRENS
J. L. OZANNE
Chicago ..... A. W. JOHANSEN
R. Z. CHEW JR.
Cleveland ..... A. L. KLINGEMAN
J. K. GILLAM
Los Angeles ..... F. J. FULLER
Griffin, Ga. ..... F. J. ALLEN
London ..... VINCENT DELPORT

Market Research and Promotion

DAVID D. GIBBS, *Manager*
JEANNE FRANKLIN
MILDRED CHRISTOPHER

Circulation Department

G. R. EBERSOLE, *Manager*
BETTIE THOMPSON

Classified Advertising Department

DOLORES BRANT, *Manager*

Production Department

RICHARD J. STRNAD, *Manager*

Main Office

Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Offices

New York, 17 ..... 60 East 42nd St.
Murray Hill 2-2581
Chicago, 11 ..... 520 N. Michigan Ave.
Whitehall 4-1234
Detroit, 2 ..... 6560 Cass Ave.
Trinity 5-3024
Los Angeles, 48 ..... 6262 Commodore Sloat Dr.
Webster 1-6865
Pittsburgh, 19 ..... 2837 Koppers Building
Atlantic 1-3211
Washington, 4 ..... 1123 National Press Building
Executive 6849
London ..... 2 Caxton St.
Westminster, S.W. 1
Griffin, Ga. ..... 331 South 12th St.

Published monthly by

THE PENTON PUBLISHING COMPANY

G. O. HAYS ..... *President and Treasurer*
E. L. SHANER ..... *Chairman*
R. C. JAENKE *Vice Pres., Director of Adv.*
F. G. STEINEBACH *Vice Pres., and Secretary*
J. P. LIPKA *Asst. Secy. and Asst. Treas.*
Also publisher of STEEL • MACHINE DESIGN
NEW EQUIPMENT DIGEST

Subscription: United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $5; two years $8. Other foreign countries, one year, $10. Single copies 75 cents. Copies published three months or more previous to date of current issue, $1.00.

Member: National Business Publications, Inc.; and Society of Business Magazine Editors. Copyright 1953 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland, Ohio, under act of March 3, 1879.

FOUNDRY is indexed regularly by
Engineering Index Inc.
29 West 39th St., New York 18.

ADVERTISING

A

Abrasive Shot & Grit Co., Inc. 96
Acheson Colloids Co. 61
Acme Foundry Co. 273
Adams Co., The 297
Ajax Electric Co., Inc. 153
Ajax Electric Furnace Corp. 153
Ajax Electrometallurgical Corp. 153
Ajax Electrothermic Corp. 153
Ajax Engineering Corp. 153
Alabama By-Products Corp. 262
Allied Chemical & Dye Corp., Semet-Solvay Div. 266
Allied Chemical & Dye Corp., Solvay Process Div. 171
Allis-Chalmers 9, 38, 63
Allis-Chalmers, Tractor Div. 15
Alloy Metal Abrasive Co. 189
American Air Filter Co., Inc. 20, 21
American Air Filter Co., Inc., Herman Nelson Div. 281
American Bridge Div., United States Steel Corp. 277
American Chain & Cable, American Chain Div. 98
American Chain Div., American Chain & Cable 98
American Cystoscope Makers, Inc. 94
American Lacquer Solvents Co. 280
American Lava Corp. 99
American MonoRail Co. 64
American Smelting & Refining Co. 281
American Smelting & Refining Co., Federated Metals Div. 241
American Wheelabrator & Equipment Corp. 46, 47, 163
Apex Smelting Co. 169
Aquadyne Corp. 283
Archer-Daniels-Midland Co., Foundry Products Div. 4, 5
Atlantic Abrasive Corp. 261
Austin-Western Co. 59
Automotive Pattern Co. 261

B

Babcock & Wilcox Co., The, Refractories Div. 29
Bailey, William M., Co. 255
Bakelite Co., A Div. of Union Carbide & Carbon Corp. 185
Baldor Electric Co. 296
Barber-Greene 275
Baroid Sales Div., National Lead Co. 44
Bartlett, C. O., & Snow Co., The ..... Back Cover
Bay State Abrasive Products Co. 197
Beardsley & Piper Div. of Pettibone Mulliken Corp. 165, 166, 199, 200
Bell, M. A., Co. 252
Birmingham Committee of 100 86
Black, Sivalls & Bryson, Inc. 23
Blaw-Knox Co., Blaw-Knox Equipment Div. 283
Borden Co., The 75
Botfield Refractories Co. 273
Brummeler Steel Products Corp. 280
Buffalo Forge Co. 22
Buffalo Pattern Works, Inc. 69

C

Campbell-Hausfeld Co., The 245
Carborundum Co., The ..... Inside Front Cover, 65, 93, 261
Carman, Edwin S., Inc. 276
Cedar Heights Clay Co. 13
Cement Gun Co. 276
Centrifugal Casting Machine Co. 279
Chicago Eye Shield Co. 237
Christiansen Corp. 83
Cities Service Oil Co. 56
Clearfield Machine Co. 18
Cleveland Chaplet & Mfg. Co. 284
Cleveland Crane & Engineering Co., The, Cleveland Tramrail Div. 27
Cleveland Flux Co., The 173
Cleveland Metal Abrasive Co., The 158
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co. 27
Columbia-Southern Chemical Corp. 279
Columbus McKinnon Chain Corp. 243
Continental Copper & Steel Industries, Inc., Niagara Falls Smelting & Refining Div. 265
Corn Products Refining Co. 275
Crobaugh, Frank L., Co., The 280

D

Daniels, C. R., Inc. 272
Dayton Pneumatic Tool Co. 284
DeBardeleben Coal Corp. 280
Delta Oil Products Co. 58
Demmler, Wm., & Bros. 72, 73
Detroit Electric Furnace Div., Kuhlman Electric Co. 24
Detroit Testing Mahcine Co. 262
Desmond-Stephan Mfg. Co., The 236
Diamond Iron Works, Inc., Mahr Mfg. Co. Div. 281
Dietert, Harry W., Co. 286
Dings Magnetic Separator Co. 25
Dravo Corp. 14
Durez Plastics & Chemicals, Inc. 247
Dust Suppression & Engineering Co. 264

E

Eastern Clay Products Dept., International Minerals & Chemical Corp. 151
Eastman Kodak Co., X-Ray Div. 179
Eaton Chemical & Dyestuff Co. 278
Eclipse Fuel Engineering Co. 238
Electric Furnace Co., The 282
Electro Metallurgical Co., A Div. of Union Carbide & Carbon Corp. 79
Electro Refractories & Abrasives Corp. 232

F

Federal Foundry Supply Co., The 2, 39, 40, 41, 42
Federated Metals Div., American Smelting & Refining Co. 241
Flexible Steel Lacing Co. 226
Foundries Materials Co. 244
Foundry Equipment Co., The 48
Foundry Services, Inc. 248
Fremont Flask Co., The 60
Fuller Co. 92

G

Gardner-Denver Co. 57
General Electric Co., X-Ray Dept. 77
General Refractories Co. 219
Gerotor May Corp. 272
Girdler Co., The, A Div. of National Cylinder Gas Co. 141

INDEX

Gordon, Claud S., Co. 256
Great Lakes Carbon Corp., Electrode Div. 89
Great Western Mfg. Co. 285
Green, A. P., Fire Brick Co. 207

H

Harbison-Walker Refractories Co. 11
Harnischfeger Corp., Overhead Crane Div. 66
Harnischfeger Corp., Welding Div. 271
Hauck Mfg. Co. 278
Herman Pneumatic Machine Co. 70, 71
Hewitt-Robins, Inc. 90, 91
Hickman, Williams & Co., Inc. 270
Hines Flask Co., The 50, 51
Homer Mfg. Co., Inc., The 284
Hough, Frank G., Co., The 76
Hydro-Blast Corp. 249

I

Imperial Belting Co. 10
Induction Heating Corp. 6
Industrial Equipment Co. 88
Ingersoll-Rand 214
Industrial & Foundry Sales, Inc. 223
International Graphite & Electrode Div., Speer Carbon Co. 26
International Minerals & Chemical Corp., Eastern Clay Products Dept. 151
International Molding Machine Co. ..148, 149
International Nickel Co., Inc., The 1
Ironton Fire Brick Co., The 161

J

Jobbins, William F., Inc. 195
Johns-Manville 268
Johnston Mfg. Co. 266

K

Keller Tool Co. 240
Knight, Lester B., & Associates, Inc. 36
Kuhlman Electric Co., Detroit Electric Furnace Div. 24

L

Laboratory Equipment Corp. 282
Lanly Co., The 95
Lindberg Engineering Co., Lindberg-Fisher Div. 193
Lindberg-Fisher, A Div. of Lindberg Engineering Co. 193
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp. 74
Link-Belt Co. 55

Mc

McDonald, B. F., Co. 248

M

Mahr Mfg. Co. Div. of Diamond Iron Works, Inc. 281
Marblette Corp., The 180
Marquette Mfg. Co., Inc. 284
Master Pneumatic Tool Co., Inc., The 282
Mathews Conveyer Co. 177
Metal Blast, Inc. 137
Mexico Refractories Co. 209
Milwaukee Chaplet & Mfg. Co. 227, 240
Mine Safety Appliances Co. 242
Modern Equipment Co. 298
Monsanto Chemical Co 43
Moulders' Friend, The 28
Murphy, Jas. A., & Co., Inc. 274

N

National Carbon Co., A Div. of Union Carbide & Carbon Corp. 135
National Cylinder Gas Co., The Girdler Co. Div. 141
National Engineering Co. 16, 17
National Lead Co., Baroid Sales Div. 44
Neff & Fry Co., The 254
Nelson, Herman, Div., American Air Filter Co., Inc. 281
Newaygo Engineering Co. 143
Newcomb-Detroit 283
Niagara Falls Smelting & Refining Div., Continental Copper & Steel Industries, Inc. 265
Nicholls, Wm. H., Co., Inc. 78
Nichols Engineering & Research Corp. ... 30
Norton Co. 31, 37, 62

O

Ohio Electric Mfg. Co., The 280
Ohio Ferro Alloys Corp. 146
Oliver Machinery Co. 275
Osborn Mfg. Co., The 84, 85, 186
Ottawa Silica Co. 229

P

Pangborn Corp. 49, 52, 53
Penn Iron Works, Inc. 277
Penn-Rillton Co. 35
Peterson Core Oil & Mfg. Co. 202
Pettibone Mulliken Corp., Beardsley & Piper Div. 165, 166, 199, 200
Philadelphia Coke Co. 277
Picker X-Ray Corp. 204
Pittsburgh Coke & Chemical Co. 139
Pittsburgh Crushed Steel Co. 259
Pittsburgh Lectromelt Furnace Corp. 211
Pittsburgh Metals Purifying Co. 251
Porcelain Products, Inc. 276
Pressed Steel Co., The 82
Producers Core Sand Corp. 284
Pyrometer Instrument Co., The 273

R

R & J Foundry Co. 279
Radium Chemical Co., Inc. 246
Reda Pump Co. 254
Redford Iron & Equipment Co. 97
Republic Coal & Coke Co. 274
Republic Steel Corp. 213
Rotor Tool Co., The 157
Roura Iron Works, Inc. 278

Dear Reader:

Gentlemen: that distinguished look is by FOUNDRY Regional Manager, Al Klingeman (right) and "Polly" Pelott, Regional Manager of *Steel* (Chicago) and, for many years a member of our business staff. Candid photography by John Vaughan of *Steel* on the occasion of our recent Penton Veteran's Luncheon.

—o—

Sales promotion: Most of us who have had anything to do with the promotional aspect of selling think we know what gets the best results. It's usually a printed piece which the recipient will instinctively "reach for" because it offers *constructive assistance.*

As a reader of FOUNDRY, you should be aware of the wealth of useful literature which is "yours for the asking". Take a look at last month's issue, for example. We counted a total of 119 catalogs, bulletins and "descriptive literature" offered by the advertisers in this issue. These were in addition to 64 descriptions in the New Equipment, Trade Publications, and Ideas for Foundrymen sections.

Many of these printed aids for foundrymen are, in effect, textbooks on various subjects. We noted a handbook which tells how to analyze, organize and set up an efficient materials handling system; a 34-page bulletin of case studies on various cleaning problems and solutions; numerous manuals and guides dealing with shell molding (one a 90-page unit); a 64-page catalog of safety equipment; a brochure on taking the mystery out of sand control; tramrail engineering and application data; an offer, also, to lend one supplier's movies of foundry operations for group meetings.

Nowhere in the world today is so much practical information readily available as it is to the readers of business publications.

(*Next page, please*)

(*Continued from page* 295)

THE FOUNDRY

Whiting Foundry Equipment Co.

SUCCESSORS TO

DETROIT FOUNDRY EQUIPMENT CO

OFFICE: 225 Dearborn St. CHICAGO — WORKS: Harvey, Cook Co., Ill.

COMPLETE FOUNDRY OUTFITTERS

CRANES, CUPOLAS,

Ladles, Tumblers, Elevators,

Sand-Sifters, Trucks, Etc.

SEND FOR PRICES AND CIRCULARS

Half-century club: we recently listed 25 advertisers who were "in" FOUNDRY prior to 1903. Early advertisements of two are these of the Whiting Corporation and Buffalo Forge Company.

THE FOUNDRY

The Buffalo Steel Pressure Blower.

FOR CUPOLA FURNACES, FORGE FIRES, Etc.

Built on Adjustable Bed Combined with Countershaft.

BUFFALO FORGE CO.,

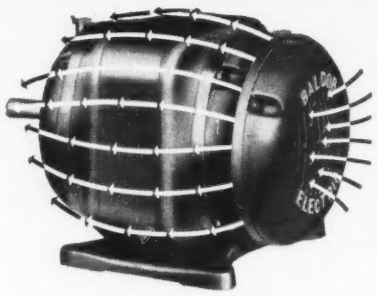
BUFFALO, N. Y.

Special mention: a new 80-page brochure published recently by Giffels and Vallet, Inc., Detroit. It shows the many projects this firm has served as architects and engineers, including several foundry assignments. Reprints of the foundry section are available, we understand. If you would like the entire brochure we suggest that you request it on your company letterhead to Roy Jones, Marquette Bldg., Detroit.

F. A. Rote

Business Manager

FOUNDRIES NEED THIS *Totally enclosed* MOTOR



Arrows indicate the forced air movement over the entire exterior of the BALDOR STREAMCOOLED® motor frame.

The BALDOR STREAMCOOLED® *Motor*

These BALDOR ball-bearing motors are SOLIDLY ENCLOSED, cooled by an outer-mounted fan in the bell-end. They cannot inhale dirt, dust, grit or metal particles. BALDOR STREAMCOOLED Motors require no dismantling for cleaning. Thus less servicing—no interruption of production. Let us tell you more about these long service life BALDOR Motors (which are sold and serviced in more than 300 Trade Centers).

BALDOR ELECTRIC CO.
4353 DUNCAN AVE. • ST. LOUIS 10, MO.

Baldor

MOTOR SPECIALISTS FOR 30 YEARS

Royer Foundry & Machine Co. 133
Royersford Foundry & Machine Co. 282

S

Schenectady Resins Div., of Schenectady Varnish Co., Inc. 267
Schneible, Claude B., Co. 32
Schramm, Inc. 263
Scientific Cast Products Corp. 256
Semet-Solvay Div., Allied Chemical & Dye Corp. 266
Shanafelt Mfg. Co., The 221
Shell Process, Inc. 81
Shepard Niles Crane & Hoist Corp. 257
Silent Hoist & Crane Co. 258
Simonds Abrasive Co. 12
Smillie, C. M., & Co. 226
Smith Oil & Refining Co. 145
Solvay Process Div., Allied Chemical & Dye Corp. 171
Sonken-Galamba Corp. 269
Speer Carbon Co., International Graphite & Electrode Div. 26
SPO, Inc. 224, 225, 236
Standard Conveyor Co. 253
Standard Horse Nail Corp. 258
Stearns Magnetic, Inc. 45
Steel Shot & Grit Co. 259
Sterling Wheelbarrow Co. 100
Stevens, Frederic B., Inc. ..... Inside Back Cover

T

Tabor Mfg. Co., The 8
Tamms Industries, Inc. 282
Thor Power Tool Co. 217
Timken Roller Bearing Co., The 19
Tousey Varnish Co. 174
Tracerlab, Inc. 274

U

Union Carbide & Carbon Corp., Bakelite Co. 185
Union Carbide & Carbon Corp., Electro Metallurgical Co. 79
Union Carbide & Carbon Corp., Linde Air Products Co. 74
Union Carbide & Carbon Corp., National Carbon Co. 135
United States Rubber Co. 80
United States Steel Corp., American Bridge Div. 277
United States Steel Corp., Subsidiaries .. 277
Universal Engineering Co. 87
U. S. Reduction Co. 54

V

Vanadium Corp. of America 7
Viking Steel Co. 272

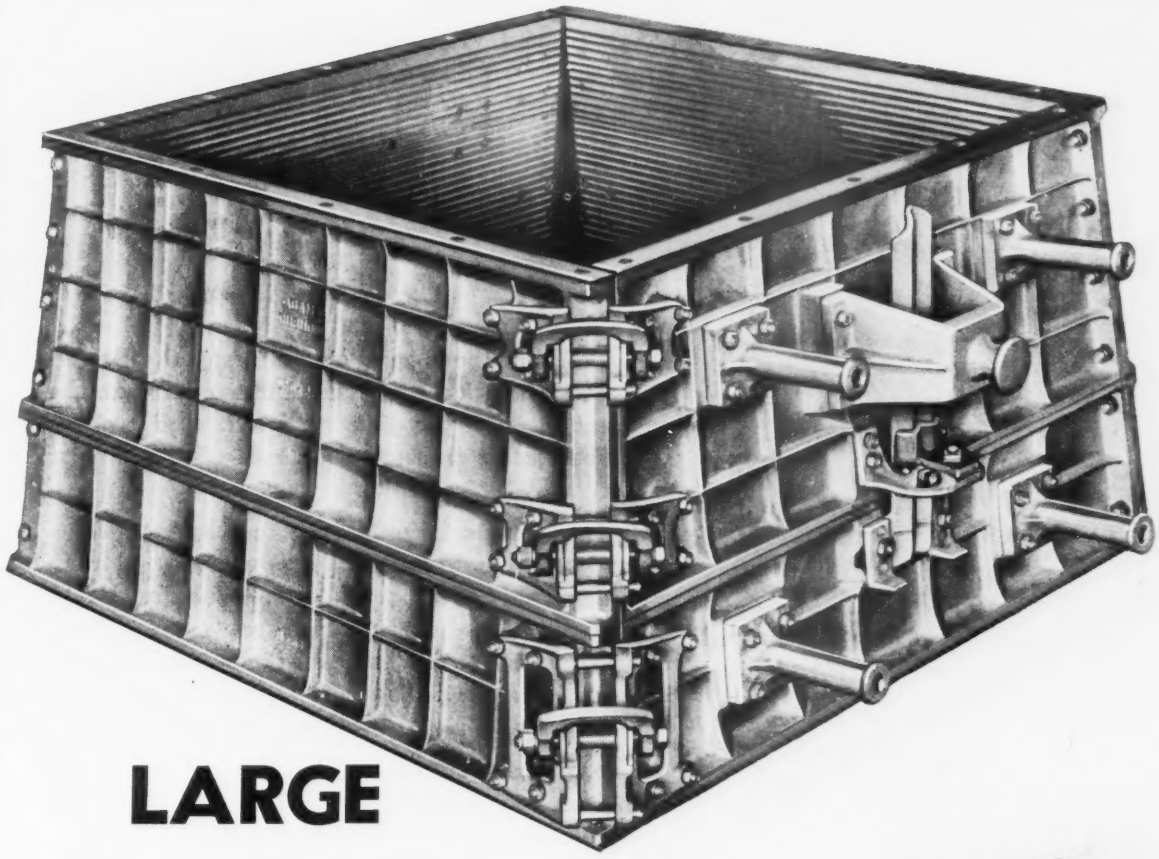
W

Wedron Silica Co. 269
Wellman Engineering Co., The 276
Western Metal Co. 235
Westinghouse Electric Corp., X-Ray Div. . 239
Westover Engineers 246, 284
Whiting Corp. 182, 183
Wiegand, Edwin L., Co. 260

Table of Contents, Page 3

Classified Advertisers, 286, 287, 288, 289, 290, 291, 292, 293

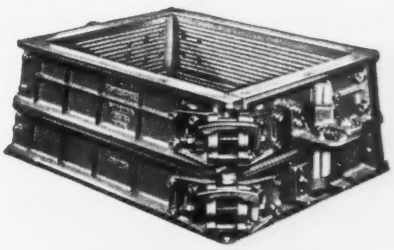
Adams Aluminum Easy Off Flasks



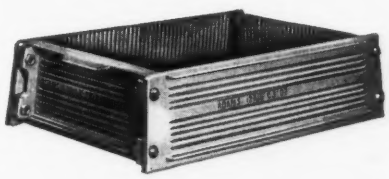
LARGE

USED WITH
ADAMS JACKETS
CAST IRON OR ALUMINUM

OR



SMALL



Assures you another winning combination from the most complete line of quality flask equipment.

Write us today for further information.

Let Adams help you analyze your flask equipment problems.

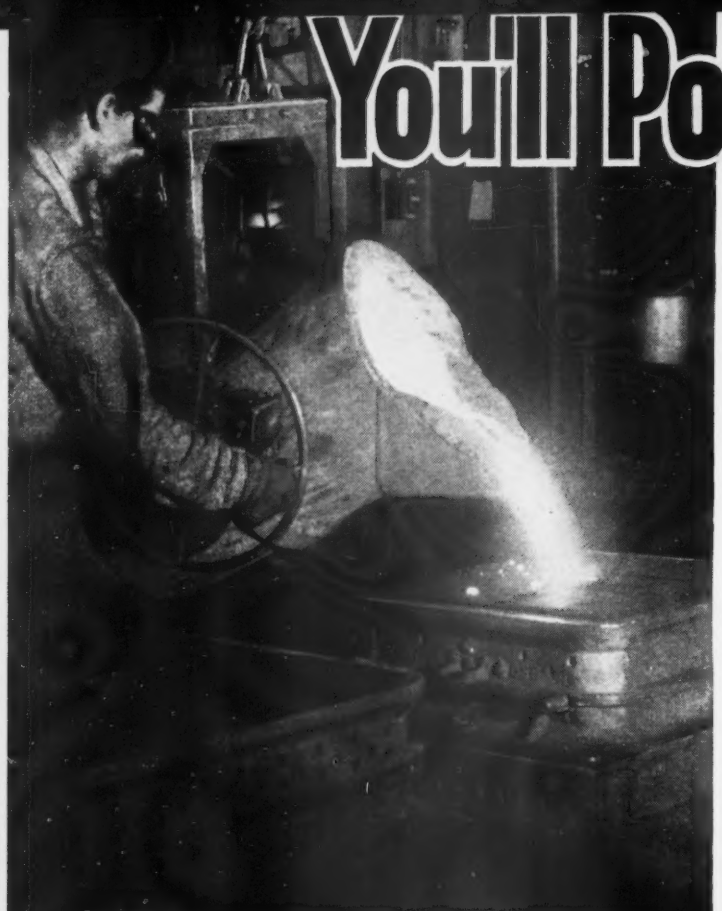
The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

DUBUQUE, IOWA, U.S.A.

You'll Pour-Off Faster



WHEN YOUR ENGINEERING
IS SYNCHRONIZED FOR...

STANDARDS
PLUS
SPECIALS

Pouring-off methods may account for the difference between getting a new contract for castings and being under-bid by as little as a half cent a pound. It's these small differences that so often weigh up heavily at the pay scale.

Differing mold heights... shifting sprue holes... distribution techniques... temperatures of metal poured... safety features and fatigue factors are but a few of the differences that can make or break pouring costs. Striking the right balance for foundry executives is our business.

WORKING TOGETHER with practical foundrymen for more than thirty years MODERN engineers have acquired much KNOW HOW in the blending of specials to enhance old standards. We shall be happy to check your problem forward and back. If your immediate problem cannot be stated on the coupon write it on your company letterhead.

SPECIAL: *One of the nation's foremost builders* of agricultural machinery required the long-reach, low-headroom, special type of ladle shown above. This ladle has a 19" top, 15" bottom and 30" depth. It met the special need.*

STANDARD: *Another prominent builder* of agricultural equipment met its high production needs with dozens of standard, geared, 1500 pound cylindrical ladles. MODERN cylindrical, mixing ladles of 8000 pounds capacity receive the metal from the cupolas.*

**Names on request.*

MODERN EQUIPMENT CO.
PORT WASHINGTON, WISCONSIN

MODERN EQUIPMENT COMPANY, Dept. F-12, Port Washington, Wis.
Without cost or obligation mail:
Catalog on metal pouring systems ☐
Cupolas and cupola chargers 147A ☐
Cranes and monorail systems 150 ☐
More information on FREE use of MODERN films ☐

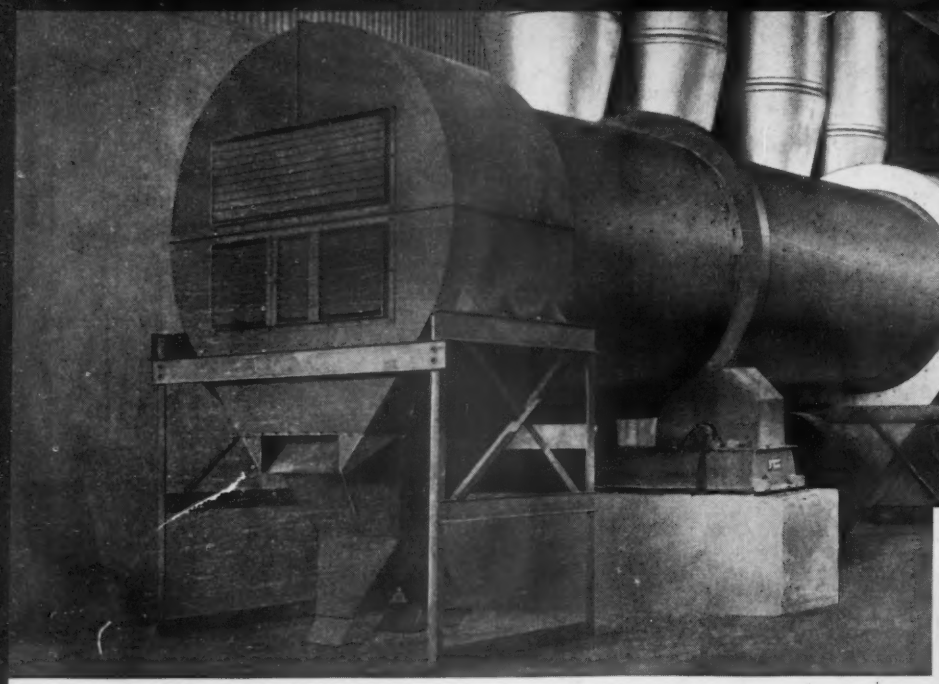
Company.....
Street..... Zone.....
City..... State.....
Individual.....

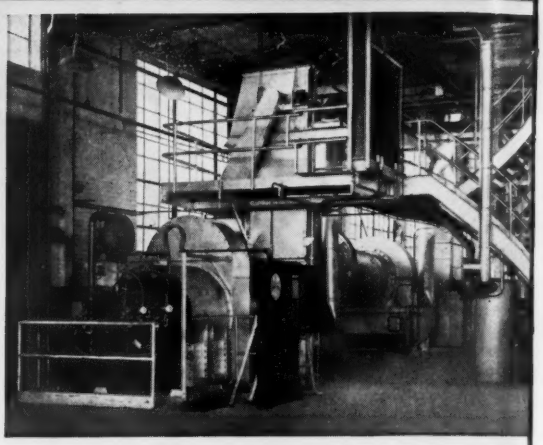
Our 71st Yuletide Message to Our Friends of the Foundry Industry

Please accept these Holiday Wishes for health, happiness and prosperity . . . and add to them a sincere "Thank You" from all of us at Stevens.

FREDERIC B.
STEVENS
INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 16, MICHIGAN

BRANCHES: BUFFALO • CLEVELAND • INDIANAPOLIS • NEW HAVEN • DAYTON
IN CANADA: FREDERIC B. STEVENS OF CANADA, LTD., TORONTO • MONTREAL • WINDSOR

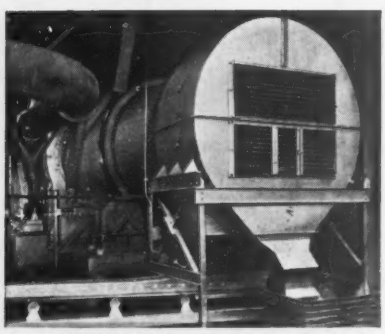




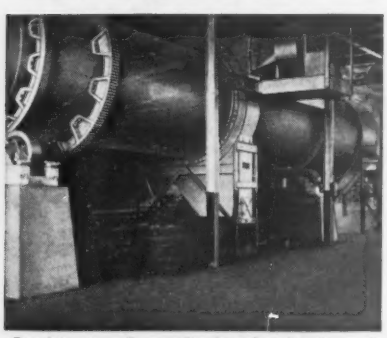
Above: Two Core Sand Rotary Dryer-Coolers 102" in Diameter by 66 Feet Long in Large Automobile Foundry. At the *Right:* Core Sand Dryer-Cooler in Farm Equipment Foundry Showing Furnace Arrangement.

For Your Core Room

combination Dryer-Coolers



Discharge End of Large Dryer-Cooler Showing Belt Conveyor for Dried Sand, and Tailings Chute for Scalpings.



Combination Dryer-Cooler for Bank and Sharp Sand in Large Implement Foundry.

will provide a continuous supply of essentially bone dry sand — within 5° of room temperature "READY TO USE" — regardless of variations in the rate or moisture content of the sand fed

● Assure exact duplication of every core mix — save on binders — get a uniform bake and constant core structure reducing losses of both cores and castings by passing incoming sand through a Bartlett-Snow combination Dryer-Cooler. Gas or oil fired types. Built-in scalping screen removes foreign material. Automatically controlled. Furnished complete with storage and handling equipment. Sizes to meet **your** capacity requirement.

DESIGNERS

ENGINEERS

BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS

ERECTORS

Foundrymen Who Know — Buy Bartlett-Snow

FOUNDRY

Index

Volume 81

1953

The Penton Publishing Company
Penton Building
Cleveland 13, Ohio

Index—January-December, 1953

	Issue	Page
A		
ABC Die Casting Machine Co. Offers Unit	May	329
ABC of Foundry Practice: Jan. 191; Feb. 195; Mar. 293; Apr. 217; May 243; June 215; July 163; Aug. 195; Sept. 255; Oct. 197; Nov. 287; Dec. 203		
Abell-Howe Co. Offers Manual Crane	May	331
Abrasive-Faced Castings, To Make (Q & A)	May	166
Accelerated Training Program Pays Off	Oct.	148
Accident Reports, Discusses (FD)	Apr.	160
Acheson Colloids Holds General Sales Meeting	Sept.	236
Acme Aluminum Alloys Inc., Controlled Production at	Apr.	108
Acme Foundry Co. Reaches 50th Anniversary	Aug.	181
Air Centrifuge, Offers	Sept.	290
Air Connection, Announces Detachable	Dec.	231
Air Pollution		
And Safety, Holds Conference on	Apr.	190
Chicago Plans Study of	Nov.	210
Research Is Answer to	Nov.	252
Air Pollution Control Association Plans Meeting	May	215
Air Speed Tool Co. Offers Lubricator	Sept.	292
Air Strength, Castings Play Part in Developing	Mar.	190
Air Reduction Co. Opens Union, N. J., Plant	Jan.	152
Air Weight Control, Announces	Feb.	229
AiResearch Mfg. Co. Uses Plastic Coreboxes	Feb.	132
Ajax Engineering Corp., Austrian Engineers Visit	July	185
Alarm, Offers Power Failure	Dec.	242
All-State Welding Alloys Co. Offers Welding Rod	Oct.	266
Allis-Chalmers Mfg. Co.		
Core Drier, Designs Dielectric	May	314
Core Drier, Designs Space Saving	July	256
Shakeout Design, Improves	Aug.	214
Alloy Casting Institute		
Annual Meeting, Holds	Sept.	184
Castings Conference, Joins High-Alloy	Sept.	252
Research, Broadens (FD)	May	200
Stainless Steel Casting Alloy, Develops (FD)	Nov.	170
Alloys, Casting Light-Metal	June	114
Alloys, Reports Cover New	Aug.	228
Allway Mfg. Co. Announces Saw	May	322
Aluminum Additions Suppress Zinc Fumes (FD)	Apr.	160
Aluminum Alloy Blocks in Chills, Cast (Q & A)	July	116
Aluminum Alloy Castings		
Acid Baths Add Gray Color to (Q & A)	Aug.	118
Humidity Affects Permanent Mold (FD)	June	172
Reinforce Cores for (Q & A)	Aug.	117
To Remove Cores from Permanent Mold (Q & A)	Jan.	115
Aluminum and Binary Aluminum Alloys, Viscosity of (FD)	Jan.	142
Aluminum Association Elects Officers	July	245
Aluminum-Bronze Casting, Makes Huge	May	208
Aluminum Bronze Casting Is Too Hard (Q & A)	Feb.	118
Aluminum Bronze Pins, Simplifies Casting of	Oct.	208
Aluminum Castings		
Control Important in Making	Apr.	108
Elimination of Porosity in (Q & A)	Dec.	132
Fine Grain Sand, Require (Q & A)	Aug.	120
Progress in	May	124
Sharp Tools Are Required to Machine (Q & A)	Sept.	136
Aluminum Co. of America		
Cleveland Research Division Includes Foundry	Oct.	176
Fire-Fighting Unit, Develops	Feb.	136
Newly Developed X-ray Device, Tests	Dec.	147
Quality Control at Buffalo Works of	Dec.	120
Spectrometers, Employs Direct Reading	Nov.	271
Steel Cylinder Housing, Installs Huge	July	184
Aluminum Foundry Has 3 Strings for Its Bow	Nov.	116
Aluminum Foundry, How To Avoid Trouble in the	Dec.	102
Aluminum Ladder Co. Makes Safety Shoe	Nov.	256
Aluminum Match Plate Corp., Shell Molding at	Nov.	116
Aluminum Research Institute Becomes Aluminum Smelters Research Institute	Dec.	175
Aluminum-Silicon, Grain Refinement in (FD)	Feb.	146
Aluminum-Silicon-Magnesium Casting Alloys (FD)	Feb.	146
Aluminum Smelters Research Institute, Aluminum Research Institute Becomes	Dec.	175
Aluminum-Tin Alloy Additions (FD)	Aug.	140
American Air Filter Co. Improves Dust Collector	Nov.	255
American Alloys Corp. Opens Smelting Plant	Jan.	266
American Brake Shoe Co.		
Cast Steel Freight Car Wheel, Develops (FD)	June	172
Materials Handling at	Feb.	178
Pomona, Calif. Brake Shoe Foundry, Opens	June	132
Radiant Heat Screen at Bearing Plant, Installs	Dec.	156
American Brass Co. Offers Flexible Conduit	Apr.	229
American Conveyor Co. Offers Slag Disposer	Mar.	346
American Die Casting Institute, Doehler Award of	Mar.	307
American Die Casting Institute Plans Annual Meeting	Sept.	152
American Foundry Co., Community Relations at	Aug.	111
American Foundrymen's Society		
Apprentice Contest, Announces 1954	Dec.	33
Apprentice Contest Awards, Announces 1953	June	102
Apprentice Contest Rules, Announces 1953	Mar.	306
Chicago Chapter Convention Committees	May	157
Convention, Chicago To Be Host to	Apr.	140
Convention Program, 1953	May	152
Convention Reports	June 102; July	98
Medalists, Announces 1953	May	160
National Headquarters Building, Starts	Dec.	33
National Safety Council Award, Receives	Nov.	291
Officers, Nominates	Feb.	33
Plant Visitation Schedule, Chicago Convention	May	302
Program, Plans 1953 Convention	Jan.	178
Regional Conference, California Chapters Hold	Apr.	167
Regional Conference, Canadian Chapters Hold	Jan.	132
Regional Conference, Michigan Chapters Hold	Dec.	162
Regional Conference, Niagara Frontier Chapters Hold	Nov.	307
Regional Conference, Ohio Chapters Hold	Nov.	272
Regional Conference, Southeast Chapters Hold	Apr.	151
Regional Conference, Southwest Chapters Hold	Jan.	261
Regional Conference, Wisconsin Chapters Hold	Apr.	196
Safety Conference, Co-Sponsors	Apr.	190
Technical Discussions To Highlight Convention	May	150
American Institute of Mining and Metallurgical Engineers Holds Electric Furnace Steel Conference	Feb.	186
American Institute of Mining and Metallurgical Engineers National Open Hearth Committee Convenes	June	184
American-LaFrance-Foamite Corp.		
Fire Extinguisher, Announces Carbon-Dioxide	Sept.	290
Fire Extinguisher, Develops Fast Acting	July	256
Fire Extinguisher, Offers Trigger Operated	Oct.	272
Fire Extinguisher, Offers Wheeled	Apr.	235
American Management Association		
Industrial Development Booklet, Offers	May	239
Management Conference, Plans	Oct.	234
Personnel and Financial Bulletins, Offers	Sept.	250
Production and Atomic Age Booklets, Offers	Sept.	242
Production Bulletins, Announces	May	345
Publication Catalog, Issues	Oct.	233
Recruiting College Men, Issues Data on	Dec.	175
Reports to Top Management, Offers	Dec.	170
American Metal Products Co. Offers Skid Rack	June	270
American Metaseal Mfg. Corp. Offers Impregnator	May	339
American Metaseal Mfg. Corp. Offers Metal Surfacing	Oct.	266
American Monorail Co. Offers Heavy Load Drive Unit	May	316
American Monorail Co. Offers Medium Load Drive Unit	June	270
American Optical Co.		
Face Shield, Develops	Sept.	295
Goggles, Announces Plastic Lens	Feb.	233
Goggles, Develops Heat-Resistant	Mar.	347
American Red Cross Fund	Mar.	363
American Society for Metals		
Metal Congress, Sponsors 1952	Jan.	174
Metal Congress, Sponsors 1953	Dec.	181
Officers, Announces	Dec.	181
American Society for Quality Control To Meet	May	250
American Society for Testing Materials		
Annual Meeting, Holds	Aug.	159
Annual Meeting, Plans 56th	June	204
Metal Cleaning Abstracts, Offers	July	178
Metal Powders Discussions, Issues	Sept.	204
Review of Research, Reprints	Nov.	192
Spring Meeting, Holds	May	344
Yearbook, Publishes 1953	Nov.	285
American Standards Association Approves Lighting Guide	Jan.	182
American Steel & Wire Co. Plans New Blast Furnace	July	185
American Steel Foundries, Cleaning Armor at	Aug.	178
American Steel Foundries, Story of	Sept.	126
American Wheelabrator & Equipment Co. Opens Shot Plant	Mar.	232
Ammunition, Castings for	July	88
Ampco Metal Inc. Makes Huge Aluminum-Bronze Casting	May	208
Amplifier, Offers Wired-to-Order Voice	Jan.	241
Anderson, V. D., Co. Announces Exhaust Head	Apr.	234
Andreasen, Holger, Inc. Offers X-ray Unit	Jan.	250
Andreasen, Holger, Inc. Offers X-ray Unit	Sept.	287
Annealing		
Improves Gray Iron Machinability (I)	Dec.	108
Malleable Iron Pipe Fittings (Q & A)	Jan.	114
Of White Iron, Electric	Nov.	112
Antifog Liquid, Announces	Mar.	339
Apex Smelting Co. Has Aluminum Smelting Display	July	185
Apex Smelting Co. Marks 30th Anniversary	May	310
Apprentice Program, Film Depicts	Oct.	192
Apprentice Training, Government Pushes Foundry	Dec.	33
Apprentice Training Program, Labor Department	Mar.	240
Apprenticeship Booklet, Issues	July	228
Apprenticeship Conference, Plans Eastern	May	300
Apprenticeship in Patternmaking Industry	Oct.	210
Arc Welder, Offers	Nov.	253
Archer-Daniels-Midland Co. Develops Dietert Process	July	169
Arcair Co. Offers Electrodes	July	257
Archer, Fred C., Inc. Offers Stabilizer	Apr.	236
Armco Mercantile Co. Offers Spectacles	Jan.	236
Armor, Cleaning Cast Steel	Aug.	178
Armour Research Foundation		
Annual Report, Publishes	June	187
Engineering Scholarships, Establishes	Nov.	160
Foundry Research Report, Issues	Sept.	224
Foundries in India, Aids	Sept.	154
Army Engineers Operate Mobile Foundry	Dec.	112
Arc Equipment Corp. Offers Air Hoist	July	257
Around the Country: Jan. 138; Feb. 138; Mar. 238; Apr. 146 May 206; June 188; July 208; Aug. 154; Sept. 172; Oct. 171 Nov. 158; Dec. 176		
Arrow Tools Inc. Announces Lubricator	Sept.	275
Art Pattern Works Inc., Organizes	Aug.	240
Atlas Foundry Co. Installs Infrared Heating Unit	June	270
Atlas Products Co. Offers Dock Shelter	Jan.	240

EDITOR'S NOTE—Abbreviations appearing in this index refer to the following editorial departments:

Ed—Editorial Q & A—Questions and Answers FD—Foundry Development

	Issue	Page
tomic Report, Reprints	Dec.	249
ustenal Laboratories Inc. Offers Casting Film	May	215
ustenal Laboratories Inc. Offers Investment Film	Sept.	301
ustralian Foundry, Describes	July	226
uto Specialties Mfg. Co. Develops Shell Molding	July	169
utomatic Control of Sand Moisture	Nov.	120
utomatic Factory of the Future	Nov.	177
utomatic Sprinkler Corp. of America Offers Spray Head	Mar.	352
utomatic Transportation Co. Designs Industrial Truck	Aug.	214
utotron Co. Offers Photoelectric Light	July	253
yers Mineral Co. Reaches 50 years	June	297

B

Back-up Material for Shell Molds	Nov.	178
Bag Packer, Announces	July	259
Baker-Lull Corp. Announces Hydraulic Loader	Sept.	274
Baker-Lull Corp. Offers Tractor Loader Attachment	May	328
Baker-Raulang Co.		
Anniversary, Celebrates 100th	Nov.	234
Fork Lift Truck, Announces	July	246
Fork Lift Truck, Develops	Oct.	276
Load Pusher, Develops	Feb.	243
Balance, Announces Scale	June	261
Baldwin-Lima-Hamilton Corp.		
Extensometer for Tensile Strength Tests, Offers	Nov.	262
Hydraulic Tester, Builds	July	221
Torsion Test Device, Develops	Oct.	267
Universal Hydraulic Test Machine, Builds	Nov.	168
Ballymore Co. Offers Conveyor Walk-Over	Apr.	236
Balmar, Franklin, Corp.		
Grinder, Offers Flexible Shaft	Nov.	265
Hand Tool, Announces	Mar.	348
Handpiece, Offers Quick Change	Dec.	231
Truck Mount, Develops	May	340
Band Saw Guide, Announces	Jan.	250
Band Saw Welder, Offers	May	316
Barber-Greene Co.		
Canadian Branch, Opens	Nov.	194
Drying Machine, Announces	June	256
Material Handling Film, Offers	Mar.	290
Baron Industries Offer Vapor Degreaser	Nov.	256
Barrel Cleaner, Announces	June	256
Barrel Skid, Announces	Feb.	240
Barrett-Cravens Co. Announces Lift Unit	Aug.	219
Basic Materials Exposition, Plans 1953	June	204
Basic Materials Exposition, Plans 1954	Dec.	147
Bath Tub Castings, "Bill" Discusses	Nov.	250
Battelle Memorial Institute		
Copper-Base Alloy, Develops (FD)	July	160
Research Service, Establishes	July	166
Swiss, German Centers, Opens	Feb.	263
X-ray Device, Develops New	Dec.	147
Battery, Offers Plastic Covered	Jan.	243
Battery, Redesigns	May	329
Battery Charger, Announces	Sept.	294
Bausch & Lomb Optical Co. Announces Spectrograph	Dec.	231
Bausch & Lomb Optical Co. Offers Colorimeter	Apr.	232
Bayliss Rolls Ltd. Completes Crewe Foundry	Feb.	108
Bean, Morris, & Co. Enlarges Foundry	Oct.	200
Bearings, Producing Thin-Wall (Q & A)	Aug.	120
Beardsley & Piper Division Offers Sand Muller	May	332
Belgian Foundry Progress	Sept.	108
Belt Link, Redesigns Steel	Dec.	236
Belting		
Conveyor, Announces	Aug.	220
For Foundry Applications, Conveyor	Aug.	86
Hinged Steel, Offers	May	321
Bench, Offers Welding	Nov.	256
Bernard Welding Equipment Co. Offers Connector	May	341
Beryllium Corp. Completes Chest X-ray Survey (FD)	July	160
Beryllium Inhibits Metal-Mold Reaction (FD)	Oct.	171
Bete Fog Nozzle Inc. Offers Narrow-Angle Nozzle	June	258
Bethlehem Steel Co. Casts Huge Blast Furnace Bell	Feb.	136
Bethlehem Steel Co. Casts Largest Propeller	Oct.	176
Bibliography of Technical Reports, Offers	Nov.	166
Bill, Adventures of: Jan. 198; Feb. 218; Mar. 328; Apr. 206; May 290; June 250; July 234; Aug. 208; Sept. 245; Oct. 258; Nov. 250; Dec. 196		
Bin-Dicator Co. Announces Bin Level Indicator	Aug.	216
Bin-Dicator Co. Offers Bin Level Indicator	Oct.	268
Bin-Flow Device, Announces	Sept.	284
Binks Mfg. Co. Announces Air Connection	Dec.	231
Birmingham District Chapter of the AFS		
Dielectric Core Baking, Considers	Mar.	272
Pattern Contest Winners, Honors	June	234
Southeastern Foundry Conference, Plans	Feb.	134
Statistical Quality Control, Considers	Jan.	212
Birmingham Searches for Industry	May	300
Blacking Compound, Announces	Feb.	238
Blades, Announces Diamond	July	248
Blank Gear Cracks on Rim (Q & A)	Sept.	140
Blast Cleaner, Announces	July	246
Blastcrete Equipment Co. Offers Gun Nozzle	Oct.	272
Blastcrete Equipment Co. Offers Refractory Gun	May	324
Blasting Machine, Redesigns	May	314
Bloom Engineering Co. Announces Oil Burner	Jan.	236
Blosjo Enterprises Announces Hardness Tester	Mar.	340
Blow Ring, Announces	May	332
Blower, Announces High-pressure	Jan.	241
Blower, Offers Large Volume	Mar.	354
Blower-Exhauster, Announces	May	325
Blowpipe, Offers Welding	Apr.	237
Blue M Electric Co. Features Batch Oven	Apr.	227
Bonding Material Dispenser, Offers	Oct.	267
Book Review:		
ASTM Standards—Cement, Concrete, Ceramics, Thermal Insulation, Road Materials, Waterproofing, Soils	Aug.	228
ASTM Standards—Copper and Copper Alloys	Aug.	156
ASTM Standards—Ferrous Metals	Apr.	215
ASTM Standards—Fuels, Petroleum, Aromatic Hydrocarbons, Engine Antifreezes	Aug.	190
ASTM Standards—Nonferrous Metals	Mar.	336
ASTM Standards—Paint, Naval Stores, Wood, Sandwich and Building Constructions, Fire Tests	Apr.	144
ASTM Standards—Textiles, Soap, Water, Paper, Adhesives, Shipping Containers	July	224
Advanced Mechanics of Materials	Apr.	153
Aluminum Alloys, Analysis of	Oct.	233
Aluminum in Iron and Steel	Aug.	174
American Society for Metals Transactions	May	352
Atmospheric Pollution	May	297
Atomic Theory for Students of Metallurgy	May	239
Cellulose, The Chemical That Grows	June	191
Chemical Industry, The	Sept.	201
Cold Working of Nonferrous Metals and Alloys	Feb.	255
Drafting by the Model Method	Aug.	206
Elasticity in Engineering	Apr.	248
Elementary Metallurgy	Mar.	356
Elements of Heat Treatment	Nov.	192
Engineering Manufacturing Methods	May	250
Equipment for Thermal Treatment of Nonferrous Metals	July	178
FBI Register of British Manufacturers, 1952-53		
Father of Air Conditioning	Mar.	224
Fatigue and Fracture of Metals	Feb.	151
Fatigue and Statistical Approach	July	212
Ferrous Analysis	Sept.	168
Fifty Year Index, ASTM	Feb.	180
Gates and Risers for Castings	Feb.	245
General Metals	Feb.	188
German Foundry Publications (Molders, Molding Machine Operators and Coremakers)	July	228
Giesserei (Special Issue-Designing, Draftsman and Molder)	Sept.	188
How To Control Production Costs	July	170
How To Get the Most Out of Every Day	Feb.	255
Institute of British Foundrymen Proceedings	May	349
Intelligent Use of the Microscope	Nov.	291
Joining of Metals, The	Oct.	147
Machine Shop Tooling	Apr.	256
Mainspring of Human Progress, The	Nov.	252
Manual on Industrial Water	Oct.	169
Materials Handling Equipment and Methods in U.S.A.	Oct.	176
Mechanical Inspection	June	220
Mechanics of Materials	July	158
Metal Data	Aug.	241
Metallurgy of the Rarer Metals	Oct.	241
Norton Story, The	Aug.	244
Patternmaker's Manual	June	255
Plant Location	Mar.	326
Proceedings of the American Society for Testing Materials, 1952	Sept.	270
Productivity and Economic Progress	Apr.	214
Small Business Management	Apr.	239
Tax Shelter in Business	Oct.	192
Temperature Measurement in Engineering	Dec.	192
Textbook of Engineering Materials	Oct.	262
Tool Engineers' Data Book	Sept.	242
Transactions of the American Foundrymen's Society, 1952	Feb.	141
Wood Chemistry	Apr.	138
World Production of Raw Materials	July	265
Borings, Tries Cupola Melting of (Q & A)	Oct.	132
Boss Mfg Co. Announces Safety Gloves	Feb.	236
Bottom Boards, Offers Aluminum	Dec.	247
Box		
All-Steel Stacking-Type, Announces	June	258
Automatic Dump, Announces	May	338
Corrugated Board Bin, Offers	Apr.	223
Materials Handling, Offers	Sept.	273
Wire Handling, Announces	Mar.	338
Boxcar Unloader, Announces	Mar.	339
Boyer-Campbell Co. Offers Face Shields	Sept.	280
Brake, Announces Magnetic	June	257
Brake Drums, Economical Production of (Q & A)	Jan.	114
Brammer Corp. Offers V-Belt Kit	Nov.	254
Brass and Bronze Castings	May	136
Brass and Bronze Castings, Use Coarse Sand for (FD)	Feb.	146
Brass Knob, Casting Steel Shaft into (Q & A)	June	135
Brass Melting Practice (Q & A)	Feb.	115
Brass Sweat Fittings, To Make (Q & A)	Aug.	118
Brennen Mfg. Co. Offers Welder	May	316
Brick Combinations for Rings (Data Sheet)	Apr.	163
Brick for Circular Linings (Data Sheet)	Apr.	163
Brinell Hardness Numbers, Nonferrous Alloy (Data Sheet)	May 203; June	175
Brinell Hardness, Would Reduce (Q & A)	Jan.	115
Briquets, Binder for (Q & A)	Mar.	202
Bristol Co. Announces Potentiometer	Nov.	260
Bristol Co. Announces Transmitter	Apr.	234
Britain's Largest Casting, Ships	Nov.	110
British Columbia Chapter of the AFS Plans Regional Conference	July	187
British Foundry Progress	Sept.	102
British Institute of Metals Elect Officers	Feb.	250
British Institute of Metals Holds May Meeting	June	191
British Joint Iron Council Convenes	Jan.	168
British Maintenance Team Reports U. S. Tour	Apr.	215
British Steel Castings Research Association, Forms	May	34
British Steel Founders' Association Sponsors Convention	July	224
British Steel Founders' Association Sponsors Dust Supression Research	Aug.	226
Bronze Casting Molds, Use Refractory Sand for (Q & A)	Mar.	198
Bronze Castings, Casting Ornamental (Q & A)	Aug.	117
Bronze Memorial To Honor U. S. Marine Corps	Oct.	104
Bronze Solidification, Temperature Affects	Dec.	107
Bronze Tablet Castings, Gating	Dec.	130
Bronze, To Distinguish Manganese and Aluminum (Q & A)	Nov.	132
Bronzes, Tin and Leaded-Tin	July	94
Brundage Co. Announces Blower-Exhauster	May	325
Brush, Announces Sweeper	Nov.	261
Brush, Offers Conveyor Belt Cleaning	Jan.	236
Buckeye Tools Corp. Announces Grinders	Sept.	272
Budd Co. Adds Foundry Machine Shop	May	210
Buick Continues Mechanization of Foundry Operations	Feb.	173
Builders Iron Foundry, Training Program at	Oct.	148
Bullard, E. D., Co. Announces Safety Hook	Dec.	237
Bureau of Mines Tests West Coast Pig Iron	Nov.	192
Bureau of Ships Revises Foundry Manual	Sept.	34

	Issue	Page
Burn-out of Cupola Refractories (FD)	July	160
Burner, Announces Gas-Fired Line	Sept.	296
Burner, Announces Gas-Oil	Mar.	339
Burrell Corp. Announces Laboratory Furnace	Jan.	244
Buschman, E. W., Co. Offers Cable Conveyor	Sept.	272
Bushings, Core Mix for Brass (Q & A)	Apr.	116
Bushings, Holes Appear in Bronze (Q & A)	Apr.	117
Business and Defense Services Administration, Forms (Ed)	Nov.	99
Button Castings, To Produce Wear Resistant (Q & A)	Dec.	134
Buyers and Sellers Rate Each Other	Sept.	180

C

Cable Connector, Announces Combination	May	341
Calcium Carbide Injection	Apr.	86
Calcium Carbide Injection, Discusses (FD)	Mar.	230
California AFS Chapters Hold Regional Conference	Apr.	167
California Foundry Conference, Plans	Feb.	168
California Visual Aids Co. Offers Sketching Kit	Dec.	246
Caliper, Offers Vernier	Sept.	284
Calumet Steel Castings Corp. Offers Wheel Block	Apr.	232
Cam Holds Clamp in Place (Q & A)	Jan.	116
Can You Point with Pride? (Ed)	Sept.	101
Canada and United States have 5938 Foundries	Sept.	134
Canadian AFS Foundry Conference, Holds	Jan.	132
Canton District Chapter of the AFS Elects Officers	July	197
Canton District Chapter of the AFS Studies Mechanization	Nov.	230
Capps, C. I., Co. Casts Aluminum Bronze Pins	Oct.	208
Carbide Injection, Calcium	Apr.	86
Carbon Analysis, Obtaining Samples for (FD)	May	200
Carbon in National Defense, Importance of	Nov.	278
Carbon in Stainless Steel, To Reduce High (Q & A)	Jan.	114
Carbon Pickup, Coke Quality and	Oct.	116
Carbon Rod, Announces	Aug.	221
Cargan Products Co. Announces Gun Mix	Apr.	222
Carl-Mayer Corp. Announces Core Oven	Oct.	277
Carl-Mayer Corp. Offers Mold Oven	Sept.	272
Carol Chemical Products Corp. Offers Lens Cleaner	May	316
Cartoons—Blakely, Tom:	Oct. 154, 241, 253; Nov.	184
Cartoons—Danch, Bill:	Oct.	192
Cartoons—Genovese, Joe:	Jan. 258; Mar. 365; Apr. 265; June 160, 162, 207; July 274; Nov. 248	154,
Cartoons—Hecker, Jack E.:	Jan. 274; Feb. 226,	247
Cartoons—Hopkins, Curtis:	Apr. 244; May 355; Sept. 174; Oct. 210, 220	232; Nov.
Cartoons—Tharp, William G.:	July 224, 245; Aug. 252; Oct. Dec. 164, 192	244;
Carwheel, Develops Cast Steel (FD)	Aug.	140
Case, J. I., Co. Replaces Heating System	May	288
Cast Iron Blocks, Shrinkage Occurs in (Q & A)	Dec.	134
Cast Iron, Porosity in White	June	128
Cast Metals and the University	Sept.	162
Cast-Weld Construction, Discussion of (FD)	Feb.	148
Casting Design Improved by Welding	Feb.	148
Casting Design for Heavily Loaded Parts	Jan.	94
Casting Light-Metal Alloys	June	114
Casting Shipment Statistics (Ed)	Jan.	85
Casting Shipments by Months: Jan. 129; Feb. 129; Mar. 227; Apr. May 187; June 195; July 175; Aug. 143; Sept. 159; Oct. 161; Nov. 151; Dec. 159		133;
Casting Weight Formulas (Data Sheet)	July 149; Aug. 151; Sept. 265; Oct. 255; Nov. 203; Dec.	187
Castings Play Part in Developing Air Strength	Mar.	190
Caterpillar Tractor Co. Demonstrates Tractor Shovel	Apr.	170
Cement, Announces Core	Oct.	266
Centinela Industrial Supply Co. Offers Clamp	May	338
Central Illinois Chapter of the AFS		
Christmas Party, Holds	Feb.	210
Core Practice and Foundry Losses, Studies	May	270
Essentials for Castings, Considers	Apr.	172
Officers, Elects	July	188
Romance of Metals, Studies	Jan.	212
Safety Record Improvement, Studies	June	238
Sand, Considers Foolproof	Mar.	254
Central Indiana Chapter of the AFS		
Foundry Improvements, Considers	Feb.	215
Metals Casting Conference, Plans	Oct.	232
Officers, Elects	July	200
Refractories, Considers Foundry	June	222
Sand Reclamation, Studies	Apr.	182
Shell Molding Resin Binders, Considers	May	281
Steel Metallurgy and Foundry Practice, Studies	Mar.	248
Central Michigan Chapter of the AFS		
Aviation Castings, Considers	Nov.	233
Cupola Control, Considers	Apr.	181
Shell Molding Process, Considers	Aug.	188
Central New York Chapter of the AFS		
Aluminum Sand Casting Defects, Studies	Nov.	230
Clambake, Holds Annual	Aug.	182
Officers, Elects	July	200
Refractories, Discusses	Dec.	215
Central Ohio Chapter of the AFS		
Gating Design, Considers Effect of	June	242
Human Relations, Considers Industrial	Mar.	242
Mechanization in Molding, Studies	May	278
Nodular Iron, Considers	Apr.	189
Sand, Considers Foolproof	Jan.	212
Centri-Die Process, Lebanon Steel Acquires	Sept.	202
Centrifugal Casting Machine		
For Ferrous or Nonferrous Castings, Offers	Feb.	228
Vertical and Horizontal, Offers	Sept.	272
Water-Cooled, Announces	Apr.	230
Centrifugal Casting Machine Co. Offers Turntable	Feb.	228
Centrifugal Casting Machine Co. Offers Water-Cooled Unit	Apr.	230
Centrifugal Casting of Iron Pipe	Jan.	98
Centrifugal Casting of Jet Plane Parts	Sept.	202
Centrifugal Pump Castings, Use Cast Iron for (Q & A)	May	166
Century Electric Co. Offers Gearmotor	Oct.	278
Cerium-Lanthanum Compounds Improve Steel Properties (FD)	Jan.	142
Chain, Announces Sprocket	Nov.	266
Chain, Offers Conveyor	Dec.	230
Chain Belt Co. Announces Return Idler	Oct.	279
Chain Belt Co. Announces Sprocket Chain	Nov.	266
Chain Drive Overload, Announces	Nov.	261
Chaplet in Place, Bolt Holds (Q & A)	Mar.	118
Chaplets, Method of Anchoring Lamp Post (Q & A)	May	142
Charlotte Pipe & Foundry Co. Installs Scrap Saver	Nov.	100
Checker, Announces Furnace	May	328
Chelsea Fan & Blower Co.		
Duct Fan, Announces	Sept.	279
Penthouse, Announces	June	264
Ventilator, Develops Roof	May	330
Chesapeake Chapter of the AFS		
Cast Metals Course, Sponsors Vocational	July	187
Cupola Operations Seminar, Holds	Jan.	188
Lynchburg Foundries, Visits	Nov.	226
Nodular Iron, Considers	June	244
Outing, Holds Annual	Oct.	227
Oyster Roast, Holds Annual	Mar.	271
Seminar, Holds Casting Improvement	Dec.	242
Chicago Builds Underground Garage and Skyscraper	May	206
Chicago Chapter of the AFS		
Convention Committees, 1953	May	157
Gating Film, Views	Jan.	224
Group Discussion Meeting, Holds	Mar.	257
Management Program, Holds	Nov.	236
Melting School, Announces Annual	Jan.	260
Officers, Announces New	Apr.	174
Officers, Elects	June	241
Round-table Meeting, Holds	Feb.	215
Round-table Sessions, Holds	Dec.	206
Stag Outing, Holds Annual	Oct.	227
Chicago Eye Shield Co. Offers Safety Goggles	Feb.	228
Chicago Foundrymen's Association Honors Members	Apr.	214
Chicago Steel Foundry Installs Dust Suppressor	Dec.	194
Chicago To Be Host to AFS National Convention	Apr.	140
Chill and Mottle Formation in Cast Iron (FD)	Jan.	142
Chill Coating Material, Discusses Steel (Q & A)	Oct.	136
Chill Is Easy To Remove from Wheel, Split	July	170
Chilling Machine, Announces	July	255
Chilling Power of Sand, Discusses (FD)	Mar.	230
Choosing the Right Copper-Base Alloy	Oct.	114
Christmas Seals, Buy	Dec.	228
Chromate or Dichromate Applications (Q & A)	May	162
Chrysler Corp. Builds New Orleans Foundry	Apr.	148
Chrysler Corp. Uses Aluminum Automotive Castings	Sept.	268
Cincinnati District Chapter of the AFS Studies Foundry Sands	Jan.	220
Cincinnati District Chapter of the AFS Studies Melting Furnace	Apr.	172
Circuit Breaker, Announces	Feb.	226
Circular Castings, Gate System for (Q & A)	Mar.	202
City Pattern Foundry & Machine Co., Induction Melting at	Apr.	102
Clamp		
Alloy Steel, Develops One-Piece	May	338
Cast Iron Pipe, Announces	Nov.	255
Holds Crucible in Pouring Shank	Nov.	242
With Small Cam, Tightens (Q & A)	Jan.	116
Clark Bros. Co. Builds Giant Compressor	Apr.	170
Clark Equipment Co.		
Electric Fork Truck, Announces	Mar.	340
Fiftieth Anniversary Parade, Holds	Oct.	180
Fork-Lift Truck, Produces 150,000th	June	198
Lift Truck Drive, Develops	Nov.	255
Pallet Truck, Offers	Jan.	251
Safety Film, Offers	Apr.	138
Snowplow Attachment, Announces	Feb.	233
Truck, Develops Huge Fork Lift	Dec.	150
Clark Mfg. Co. Announces Magnetic Clutch	June	262
Clean-up Campaign for Foundries (Ed)	Sept.	101
Cleaner		
Chemically Treated Glass, Offers	Oct.	270
Emulsion Metal, Announces	Mar.	340
Industrial Spray, Develops	May	330
Cleaning		
At Ford's Cleveland Foundry	Mar.	174
Cast Steel Armor	Aug.	178
Steel Castings	Feb. 92; Mar. 194; Apr. 96; May	218
Cleveland Vibrator Co. Offers Air Vibrator	May	330
Clipper Mfg. Co. Offers Masonry Saw	Feb.	242
Clutch, Offers Magnetic	June	262
Coating		
Insulating Spray, Develops	Oct.	270
Powdered Metal, Announces	Aug.	218
Silicone Resin Base, Develops (FD)	May	200
Silicone Roof, Announces	Sept.	290
Coating Material for Steel Chills (Q & A)	Oct.	136
Cobalt-60 Radiography Course, Offers	Sept.	242
Cobalt-60 Training, Offers	Feb.	196
Coddington, E. D., Mfg. Co. Offers Bag Packer	July	230
Coefficients of Equivalence, Manganese Iron and Nickel (FD)	Mar.	230
Coffing Hoist Co. Develops Spur Gear Hoist	Nov.	266
Coke Production and Consumption: Jan. 130; Feb. 130; Mar. 228; Apr. 134; May 187; June 196; July 176; Aug. 144; Sept. 160; Oct. Nov. 152; Dec. 160		162
Coke Quality and Carbon Pickup	Oct.	116
Cold Shuts Appear in Soil Pipe Castings (Q & A)	June	138
Color Improves Office Efficiency	Jan.	144
Colorimeter, Announces Monochromatic	Apr.	222
Columbia University Heat Flow Laboratory, Describes	July	242
Compressed Air Finds Wide Foundry Use	Sept.	212
Compressor, Offers Gas or Air	Jan.	242
Compressor, Offers Stationary Air	Aug.	218
Conduit, Announces Flexible	Apr.	222
Conduit Fitting, Offers	Sept.	284
Conforming Matrix Corp. Offers Painting Machine	May	330
Connecticut Nonferrous Foundrymen's Association		
Copper Oxides, Studies Use of	Dec.	216
Core Blowing in Jobbing Foundries, Studies	May	276
Electric Boat Co., Visits	June	240
Officers, Elects	Feb.	214
Shell Molding Practice, Considers	Jan.	212
Zircon Sand, Considers	Nov.	232
Connector, Announces Interlocking	June	262
Consolidated Vultee Aircraft Corp. Pattern Shop	Feb.	196
Continental Can Co. Offers Hot Drink Cup	Feb.	228
Continental Gin Co. Offers Conveyor Idler	Mar.	340
Control Important in Intricate Aluminum Castings	Apr.	170
Controller, Announces Pyrometer	May	328
Convention Program 1953, AFS	Jan.	170

	Issue	Page
Convention Reports, AFS June 102; July 98		
Conveyor		
Alloy Protects Hooks for, Hard-Facing (FD)	Nov.	170
Automatic Lowerator, Announces	Jan.	236
Heavy-Duty Roller, Announces	Apr.	232
Metal Belt, Announces	Oct.	282
Overhead Trolley, Announces	Sept.	272
Roller, Offers Portable	Dec.	230
Slat, Offers Hot Castings	May	335
Trolley, Announces	July	248
Walk-Over for, Offers	Apr.	236
Conveyor Belting for Foundry Applications	Aug.	86
Conveyor Equipment Manufacturers Association		
Conveyor Terminology Manual, Issues	Sept.	210
Institute, Holds	June	181
Nomenclature Manual, Offers	Feb.	188
Conveyor Terms and Definitions, Issues	Sept.	210
Convoy Inc. Announces Bin Boxes	Apr.	223
Cooler, Offers After	Aug.	223
Cooper Alloy Foundry Co. Develops New Alloy (FD)	Nov.	170
Cooper Alloy Foundry Co. Makes Use of Tubing (FD)	Dec.	167
Cooper-Bessemer Corp. Employs Physically Handicapped	Dec.	150
Copper Alloy Castings Show Shrinkage (Q & A)	Apr.	120
Copper-Aluminum, Grain Refinement in Cast (FD)	Sept.	192
Copper-Base Alloy		
Analysis of Tin in	Aug.	115
Battelle Institute Develops (FD)	July	160
Choosing the Right	Oct.	114
Phosphorus Reduces Tin in (FD)	June	172
To Degasify, Uses Dry Nitrogen (Q & A)	Nov.	129
Use of Copper Oxides in Casting	Sept.	228
Copper-Chromium Casting Technique, Wants (Q & A)	Mar.	199
Copper Oxides, Use of	Sept.	228
Copper-Zinc Ternary Alloy Experiments (FD)	Mar.	230
Core Baking System, Installs Modern	Dec.	184
Core Binder, Uses Polyester Resin as (FD)	Nov.	170
Core Blower, Offers Economical	Feb.	228
Core Blowing Equipment and Use (ABC)(I)	Dec.	203
Core Dryer		
Dielectric, Announces	May	314
Uses Sand for (FD)	Apr.	160
With Extra Loading Space, Offers	July	256
Core Oven, Announces Vertical	May	332
Core Oven, Offers Vertical Conveyor	Oct.	277
Core Production Machine, Announces	May	326
Core Vents, Gas-Testing	Mar.	278
Core Wash, Infrared Heat Speeds	June	248
Core Wires and Rods, Ideas on	May	195
Corebox		
Coremaking Speeded by	July	106
Making Cylindrical Cores without a	Oct.	152
Plaster Cores Formed in Plastic	Feb.	132
Sand-Oil Scale Forms on (Q & A)	Mar.	200
Corebox Material, Announces	June	262
Coremaking at Ford's Cleveland Foundry	Mar.	146
Coremaking Speeded by Heated Corebox	July	106
Coreroom Handles Jobbing Work Efficiently	June	118
Cores		
Are Subject to Penetration (Q & A)	July	116
For Aluminum Alloy Castings, Reinforce (Q & A)	Aug.	117
For Gas Range Burners Blow along Top (Q & A)	Dec.	131
FOUNDRY Queries Users of Strainer	May	305
Give Trouble, Irrigation Fitting (Q & A)	Sept.	140
Has Difficulty in Removing (Q & A)	Jan.	115
Problem of Dielectrically Baked Resin Binder (FD)	Feb.	146
Storage Weakens (Q & A)	Mar.	199
Corn Chopper Castings, Blowholes in (Q & A)	Oct.	134
Cornwell Quality Tools Co. Offers Impact Tools	May	321
Corrosion in Soils, Measurement of Steel (FD)	Feb.	146
Corson Co. Announces Sand Blaster	June	263
Cost Methods, Meeting Competition with Good (Part II)	Jan.	108
Cost of Molten Foundry Iron per Ton (Q & A)	Sept.	138
Costs Involved in Shell Molding	Oct.	156
Coupler, Offers Automatic	May	342
Coupling, Offers Two-Way	Oct.	278
Cracks and Hot Tears in Steel Castings	June	120
Cracks and Tears, Welcomes Discussion of	June	290
Crane		
For Half Ton Trucks, Offers	Dec.	244
For Yard Work, Announces One-Man	Sept.	287
Gas-Powered Motive, Announces	Nov.	264
Lift, Offers 30-Ton	Mar.	346
Manual, Designs	May	331
Truck, Announces 6-Ton	Feb.	239
Crane Cab, Announces Cooling	May	326
Crane Co. Opens Plant during AFS Convention	June	191
Crane Co. Operates Automatic Molding System	Dec.	154
Cranes Lighten Load at Seagrave Corp.	Feb.	176
Creep Resistance of Magnesium Alloys (FD)	Mar.	230
Crerar Metals Abstracts Expands Coverage	Aug.	174
Crescent Machine Division Offers Band Saw Guide	Jan.	250
Crouse-Hinds Co. Offers Lighting Fixture	June	266
Crucible, Device Controls Handling of	Apr.	200
Crucible Furnace, Eliminates Plugged Burners on	June	210
Crucible Furnace, Melt Gray Iron or Brass in (Q & A)	Sept.	138
Crucible in Pouring Shank, Clamp Holds	Nov.	242
Crucible-Ladle, Announces	Oct.	267
Crystal Orientation, Studies (FD)	Apr.	160
Cup Offers Hot Drink	Feb.	239
Cupola		
All Steel 3-Inch, Announces	July	258
"Bill" Discusses Operation of Small	June	250
Brick Requirements for No. 6 (Q & A)	Aug.	116
Coke Quality and Carbon Pickup in the	Oct.	116
Dimensions for Small (Q & A)	Dec.	134
Dropping the Bottom of the (Q & A)	Apr.	160
Hot Blast and Gas Cleaning, Offers	May	315
Iron Appears Oxidized in (Q & A)	Sept.	136
May Be Operated Every Day (Q & A)	Nov.	128
Once a Week, Drops Bottom of	Sept.	124
Operation of a Water-cooled (FD)	July	160
Slag Foams in (Q & A)	Jan.	116
Steel Base Ring for, Can Use (Q & A)	Sept.	136
Cupola Bottom Doors Break at Hinges (Q & A)	June	136
Cupola Charge, Smoke Elimination in (FD)	Mar.	230
Cupola Drop, Recover Iron in (Q & A)	Apr.	118
Cupola Operation, Effect of Raw Materials on (Part S)	Jan.	158
Cupola Practice, "Bill" Discusses	May	290
Cupola Pressure Gage, Making (Q & A)	May	164
Cupola Refractories, Burn-out of (FD)	July	160
Cupola Tap Hole, How To Bott (ABC)	July	163
Curtains, Announces Flame-Resistant	Mar.	351
Curtis Machine Corp. Offers Belt Grinder	Oct.	285
Cutoff Machine, Offers	Aug.	224
Cutting Torch, Offers	Jan.	237
Cutting Unit, Announces Powder	Jan.	251
Cybertronic Corp. of America Offers Pyrometer	Nov.	264
Cylinder, Offers High-Pressure Hydraulic	May	338
Cylinders and Valves, Offers	May	334
Cylinders in Horizontal Position, Pours (Q & A)	July	114

D

Dallow Lambert & Co. Develops Dust Collector	Jan.	236
Davey Compressor Co. Offers Stationary Compressor	Aug.	219
Dawson's Steel & Iron Foundries Prop. Ltd., Visits	July	226
De Laval Steam Turbine Co. Receives Merit Award	Dec.	150
Decatur Casting Co. Holds Casting Exhibit	July	158
Deere, John, Malleable Works Installs Mold Blower	Nov.	190
Degreaser, Announces Vapor	Nov.	256
Dehumidifier, Announces Self-Cleaning	Dec.	242
Delta Oil Products Co. Offers Patching Compound	Nov.	254
Demmler, Wm., & Bros. Develops Blow-Squeeze Machine	Nov.	190
Demmler, Wm., & Bros. Offers Mold Blower	Oct.	266
Dependable Machine Co. Offers Exhaust Fan	Oct.	280
Desulphurizing Results from Carbide Injection	Apr.	86
Detecto Scales Inc. Announces Platform Scale	Apr.	229
Detecto Scales Inc. Offers Platform Scales	Mar.	354
Detector, Announces Heat	July	254
Detector, Offers Electronic	Jan.	238
Determination of Feeding Systems	Oct.	128
Detroit Chapter of the AFS		
Apprenticeship Contest Prizes, Awards	May	260
British Foundry Equipment, Studies	Dec.	212
Ford Cleveland Foundry, Visits	June	245
Foundry Progress, Considers	Aug.	188
Ordnance Tank Automotive Center, Discusses	Mar.	254
Plant Personnel Relations, Studies	Jan.	226
Welding in the Foundry Industry, Studies	Apr.	178
Detroit Electric Furnace Division Offers Furnace	Feb.	229
DeWalt Inc. Announces Radial Saw	June	261
Diamond Drill Bits, Manufacture of (FD)	Dec.	167
Die Casting Machine, Offers Zinc	May	329
Die Casting Problems, Trouble-Shooting Feb. 86; Mar. 196		
Die Forge Casting Machine, Announces	Apr.	223
Diesel Cylinder Head, Has Trouble with (Q & A)	May	164
Dietert, Harry W., Co.		
Bonding Material Dispenser, Offers	Oct.	267
Moisture Determiner, Announces	June	256
Sand Controller, Announces	May	340
Sand Distribution Unit, Develops	Dec.	240
Sand School, Announces	July	265
Shell Molding Equipment, Offers	July	252
Shell Molding Process, Develops	July	169
Differential, Offers Lift Truck	June	267
Diffraction Conference, Plans	Aug.	233
Dillon, W. C., & Co. Offers Thermometer	Jan.	248
Dings Brakes Inc. Announces Magnetic Brake	June	257
Dings Magnetic Separator Co. Builds Huge Pulley	Oct.	164
Dings Magnetic Separator Co. Offers Plate Magnets	May	322
Disston, Henry, & Sons Inc. Offers Circular Saw	Feb.	236
DoAll Co.		
Band Saw, Announces	Feb.	242
Gage Block Assemblies, Offers	Mar.	338
Micrometer Check Set, Offers	Oct.	281
Dockboard, Announces Automatic	Oct.	280
Dockboards Inc. Offers Truck Attachment	Oct.	280
Dodge Mfg. Corp. Announces Sprocket	Apr.	224
Dodge Mfg. Corp. Holds Open House	Sept.	206
Dodge Steel Co. Honors 25-Year Men	Sept.	310
Dominion Foundries & Steel Ltd. Pours Huge Casting	Sept.	268
Don't Let It Happen to You (Ed)	Oct.	103
Door Knobs, Change Core Practice for Bronze (Q & A)	Nov.	129
Dow Chemical Co. Offers Magnesium Ingot	July	254
Dravo Corp. Builds, Develops Air Conditioner	July	184
Dravo Corp. Offers Space Heater	June	262
Drill, Offers Ball Bearing	Nov.	261
Drill Press and Machine Vise, Offers	Sept.	293
Drum, Offers Permanent Magnetic	Apr.	231
Ductile Properties of Ferritic Nodular Iron (FD)	June	172
Dupont de Nemours, E. I., Co. Offers Hand Cleaner	Aug.	214
Durez Plastics & Chemical Inc. Offers Liquid Resin	Feb.	240
Dust Collector		
For Light or Heavy Density, Develops	Jan.	236
Hydrostatic, Announces	Nov.	255
Reverse Flow Filter Cleaning, Offers	Dec.	232
Wet Type, Announces	Nov.	264
Dust Precipitator, Offers Electrostatic	Feb.	234
Dust Suppression, Grinder Hood Design Improves	Aug.	226
Dye Penetrant, Announces	May	322
Dynamometer, Develops Huge (FD)	Aug.	192

E

Earth Salt, Offers Rare	July	246
Eastern Canada Chapter of the AFS Sponsors Two-Day Conference	Dec.	216
Eastern Clay Products Studies Pressure Molding	Aug.	146
Eastern Equipment Inc. Offers Lenses	Aug.	220
Eastern New York Chapter of the AFS		
American Society for Metals, Meets with	June	236
Casting Design, Considers	Mar.	272
Christmas Party, Holds	Feb.	202
Manpower Problems, Considers Local	Apr.	178
Eastman Kodak Co. Offers Letter Copier	July	254
Eaton Mfg. Co. Secures Powerful X-ray Machine	Oct.	222
Eberhard Mfg. Co., Lift Truck Saves Labor at	Oct.	164

	Issue	Page
Eclipse Fuel Engineering Co.		
Filter, Offers Edge Type Plate	Dec.	243
Gas-Oil Burner, Offers	Mar.	339
Line Burner, Develops	Sept.	296
Steel Pots, Offers Metalized	Oct.	279
Econoweld Co. Announces Tubular Steel Pallet	Jan.	241
Econoweld Corp. Designs Pallet	Sept.	295
Eder Instrument Co. Makes Industrial Gastroscope (FD)	Sept.	192
Editorial:		
Can You Point with Pride?	Sept.	101
Contribution to Progress, A	Mar.	137
Don't Let It Happen to You	Oct.	103
How Are Your Prices?	Aug.	85
How's Your Quality Rating?	July	83
Industry Must Serve	Nov.	99
Keep the Scrap at Home!	Dec.	101
Let's Change Our Thinking	May	115
Let's Make It a Branch, Now	June	101
Let's Sell Intelligently	Jan.	85
Still Room for Improvement	Apr.	85
Why Not Make It Permanent?	Feb.	85
Edmont Mfg. Co. Announces Work Glove Coating	Feb.	240
Edmont Mfg. Co. Offers Plastic Gloves	Aug.	222
Electric Annealing of White Iron	Nov.	112
Electric Furnace Steel Conference, Holds	Feb.	186
Electric Machinery Co. Offers Fuse Compartments	Jan.	243
Electric Storage Battery Co. Announces Batteries	May	329
Electric Storage Battery Co. Offers Batteries	Jan.	243
Electrical Resistivity of Cast Iron, Studies (FD)	Oct.	171
Electro-Circuits Inc. Develops Immersion Testing	Sept.	221
Electro Metallurgical Co. Builds Alloys Plant	July	172
Electro Refractories & Abrasives Corp.		
Crucible-Ladle, Announces	Oct.	267
Ladle Stopper, Offers	May	314
Slag-Hole Block, Develops	Sept.	273
Electrode		
Carbon-Graphite, Announces	July	257
Spectroscopic, Announces	May	315
Steel Welding, Announces	May	329
Electrode Holder, Announces	June	258
Electrodeposition Research, Publishes (FD)	Oct.	171
Electroformed Molds, Wants Technique for (Q & A)	Oct.	133
Electronic Brain, Develops (FD)	Dec.	167
Elwell-Parker Electric Co. Offers Truck Scoop	Nov.	266
Emerson Electric Mfg. Co. Offers Drill	Nov.	261
Emery, A. H., Co. Offers Crane Scale	Oct.	267
Emery, A. H., Co. Offers Hydraulic Weighing Unit	June	266
Enameled Light-Iron Castings, Studies (FD)	May	200
Engineering Career Booklet, Offers	July	158
Engines, Shell Cores for Air-Cooled	Dec.	114
English Steel Corp. Ltd. Builds Huge Casting	Nov.	110
Equipment and Supplies, New: Jan. 236; Feb. 228; Mar. 338; Apr. 222; May 314; June 256; July 246; Aug. 214; Sept. 272; Oct. 266; Nov. 254; Dec. 230		
Equipment Mfg. Inc. Announces Wire Box	Mar.	338
Equipment Suppliers for Ford's Cleveland Foundry	Mar.	188
Ericson Mfg. Co. Offers Inspection Light	Sept.	284
Eriez Mfg. Co. Offers Magnetic Drum	Apr.	231
European Foundry Progress	Sept.	102
Eutectic Welding Alloys Corp. Offers Welding Rod	Nov.	263
Evans, Robert G., Co. Offers Diamond Blades	July	248
Eveready Briksaw Co. Offers Masonry Saws	Feb.	237
Everything Is Relative	Dec.	226
Exhaust Head, Announces	Apr.	234
Extensometer, Announces Lightweight	Dec.	247
Extensometer for Tensile Testing, Offers	Nov.	263
Eye Protection Program Is Not Costly (FD)	Mar.	230

F

Face Shield, Announces	Sept.	280
Face Shields, Redesigns	Sept.	295
Fageol Heat Machine Co. Offers Heat Panel	Dec.	245
Fairmont Chemical Co. Offers Core Cement	Oct.	266
Fan		
Direct Drive Duct, Offers	Sept.	279
Heavy Duty Exhaust, Designs	Oct.	280
Streamlined Penthouse, Announces	June	264
Farmers Engineering & Mfg. Co. Announces Amplifier	Jan.	241
Farrel-Birmingham Co. Designs Conveyor Belt Press	Jan.	152
Fasteners, Offers Wood	Feb.	234
Fauver, J. N., Co. Announces Automatic Lubrication	Nov.	255
Faver Inc. Announces Pipe Wrench	May	331
Feeder, Announces Vibratory	July	251
Feeder, Offers Vibratory	Mar.	350
Feeding Systems, Determination of	Oct.	128
Fence Hardware Castings, Use Sand Cores for (Q & A)	Oct.	136
Fenwal Inc. Offers Heat Detector	July	254
Ferro Machine & Foundry Inc. Modernizes with Color	Jan.	144
Ferro Machine & Foundry Inc., Sand Storage at	Mar.	192
Ferrous Castings Branch, BDSA Includes (Ed)	Nov.	99
File, Announces Abrasive	Aug.	214
Filler Metal Specifications, Discusses (FD)	Apr.	160
Fillet, Offers Plastic	Jan.	237
Film		
Apprentice Training, Offers	Oct.	192
Automation, Ford Offers	Oct.	176
Investment Castings, Offers	May 215; Sept.	301
Magnesium and Aluminum Casting, Offers	July	170
Material Handling, Offers	Mar.	290
Metallizing Process, Offers	Jan.	273
On Plant Safety, Offers	Mar.	356
Plumbing Fixture, Produces	July	212
Slide-Sound Safety, Announces	Jan.	204
Steel Quality, Shows	Jan.	196
Training and Safety, Announces	Apr.	128
Film Bibliography, Issues Industrial	Jan.	151
Film Presentation, How To Make Slide	Oct.	225
Films Directory, Issues Safety	Sept.	252
Filter, Offers Edge Type Plate	Dec.	243
Fire Damage Loss in Foundries, Cut (Ed)	Oct.	103
Fire Extinguisher		
Fast Acting, Announces	July	256
For Flammable Liquid, Offers	Sept.	290
For Large Scale Fires, Offers	Apr.	235
Portable Carbon Dioxide, Offers	May	342
Trigger Operated, Offers	Oct.	272
Fire Rescue Suit, Offers	Dec.	249
Firebrick, Announces Insulating	Jan.	238
Firestone Tire & Rubber Co. Produces Gun Mounts	Apr.	174
Fischer, George Ltd. Issues Anniversary Publications	Nov.	188
Fischer, George Ltd. Marks Sesquicentennial	Jan.	211
Flash-Stone Co. Offers Heat Resistant Flooring	Dec.	242
Flash-Stone Co. Offers Mastic Flooring	Nov.	262
Flask Stand, Designs Improved (Q & A)	Jan.	118
Floor Penetrant, Offers Concrete	May	341
Floor Resurfacer and Patcher, Announces	June	264
Floor Resurfacer, Offers Plastic	Mar.	338
Flooring, Announces Heat Resistant	Dec.	242
Flooring, Offers Mastic	Nov.	262
Flowmeter, Announces Indicating	Dec.	234
Fluidity Test, Applications of Gray Iron	Aug.	94
Fluidity Testing, Apparatus for Routine (FD)	Sept.	192
Flush-Tank Castings, Increase Production of (Q & A)	Feb.	114
Flux, Offers Aluminum Welding	Sept.	296
Follow Boards and Matchplates (ABC) Aug. 195; Sept. 255; Oct. 197; Nov. 287		
Ford Motor Co.		
Automation Film, Offers	Oct.	176
Cleveland Foundry Contributes to Progress (Ed)	Mar.	137
Cleveland Foundry of the	Mar.	138-189
Electronic Brain, Develops (FD)	Dec.	167
Engine Plant, Plans Additional	Oct.	33
Industrial Arts Awards Competition, Conducts	Sept.	172
Nodular Iron Subsurface Pinholing, Studies (FD)	Aug.	140
Foremen's Problems and How To Solve Them	Dec.	118
Fork Truck Load Pusher, Offers	Feb.	213
Formed Plastics Co. Develops Core Drier	Oct.	220
Foundries and Foundry Practice, "Bill" Discusses	Mar.	328
Foundries Predominate, Small	Oct.	194
Foundries, United States and Canada Have 5938	Sept.	134
Foundry Data Sheet		
Brinell Hardness Numbers of Nonferrous Alloys May 203; June 175		
Casting Weights, Formulas To Determine July 149; Aug. 151; Sept. 265; Oct. 255; Nov. 203; Dec.187		
Combinations of Brick Required for Rings	Apr.	163
Specifications (Standard):		
Bronze Bridge and Turntable Castings	Jan.	155
Bronze Castings for Locomotive Parts	Feb.	183
Leaded Nickel Brass and Bronze Sand Castings	Mar.	219
Foundry Developments: Jan. 142; Feb. 146; Mar. 230; Apr. 160; May 200; June 172; July 160; Aug. 140; Sept. 192; Oct. 171; Nov. 170; Dec. 167		
Foundry Educational Foundation		
Advisory Committee Conference, Holds	May	190
Annual Meeting, Plans Feb. 159; Mar. 224		
Educational Facilities Chart, Issues	Jan.	233
Engineering Education Objective, Achieves	Feb.	160
Michigan State College Advisory Committee Meets Mar. 240; Mar. 251		
Michigan State College Carnival, Enters	Feb.	166
Progress Report Film, Offers	Feb.	163
Foundry Employment Bulletin, Reprints	Sept.	240
Foundry Employment Statistics: Jan. 129; Feb. 129; Mar. 227; Apr. 133; May 187; June 195; July 175; Aug. 143; Sept. 159; Oct. 161; Nov. 151; Dec. 159		
Foundry Equipment Manufacturers' Association Holds 35th Annual Meeting	Dec.	144
Foundry Equipment Manufacturers' Association Plans Annual Meeting	Oct.	253
Foundry Equipment Orders: Jan. 130; Feb. 130; Mar. 228; Apr. 134; May 188; June 196; July 176; Aug. 144 Sept. 160; Oct. 162; Nov. 152; Dec. 160		
Foundry Facings Manufacturer's Association Meets	Apr.	241
Foundry Groups, Activities of: Jan. 212; Feb. 200; Mar. 242; Apr. 172; May 260; June 222; July 187; Aug. 182; Sept. 238; Oct. 227; Nov. 222; Dec. 206		
Foundry Index Ready	Feb.	193
Foundry Industry, Outstanding Opportunities for	Aug.	100
Foundry Manual, Revises Navy	Sept.	34
Foundry Plan Winner in School Contest	Oct.	188
Foundry Readers Service: Jan. 183; Feb. 197; Mar. 303; Apr. 259; May 247; June 225; July 215; Aug. 250; Sept. 233; Oct. 235; Nov. 215; Dec. 67		
Foundry Rubber Inc. Offers Cupola	July	258
Foundry Rubber Inc. Offers Metal Primer	Sept.	287
Foundry Statistics: Jan. 129; Feb. 129; Mar. 227; Apr. 133; May 187; June 195; July 175; Aug. 143; Sept. 159; Oct. 161; Nov. 151; Dec. 159		
Foundrymen and Government Controls (Ed)	Apr.	85
Foundrymen Should Accept Modern Thinking (Ed)	May	115
Foxboro Co.		
Air Weight Control, Offers	Feb.	229
Montreal Plant, Enlarges	Apr.	156
Potentiometer Indicator, Announces	Apr.	223
Fracture Test Study, Magnifying Glass for (FD)	Apr.	160
Franklin Institute Presents Clamer Medal	Dec.	226
French Foundry Progress	Sept.	106
French Team Visits Cooper Alloy Foundry	Sept.	152
Fume Washing Tower, Offers	Sept.	293
Furnace		
Brass Melting, Announces	Oct.	268
For Laboratory and Shop Melting, Offers	June	265
Heat Treating, Announces	Dec.	230
Indirect Arc Electric, Offers	Feb.	229
Induction Melting, Announces	Oct.	279
Laboratory, Announces	Jan.	244
Suspension, Announces	May	343
Warm Air Suspension, Offers	Feb.	240
Furnace Loader, Announces	Aug.	214
Furnace Manufacturers Advise Defense Department	Nov.	234
Furnace Shutoff, Announces	Apr.	329
Fuse Compartment, Offers	Jan.	243
Fyr-Kote Co. Offers Fire Retardant Paint	Dec.	235

G

G.W.B. Electric Furnaces Ltd. Offers Melting Furnace	Oct.	272
Gage, Announces General-purpose	Sept.	288

	Issue	Page
...age Block Assemblies, Offers	Mar.	338
...agger Bar, Announces	Oct.	274
...amma Industries Inc. Offers Gamma Ray Machines	Oct.	282
...amma Ray Machines, Announces	Oct.	282
...angway: Jan. 160; Apr. 144; June 167; Aug. 134; Sept. 164; Oct. 176; Nov. 248; Dec. 198		
...as Burner, Offers Nozzle-Mixing	May	322
...as Range Burners, Cores for (Q & A)	Dec.	131
...ating		
Brass Castings, Wants Information on (Q & A)	May	163
Brass Knobs Cast around Steel Shaft (Q & A)	June	135
Circular Casting, Procedure for (Q & A)	Mar.	202
For Sprocket Wheel, Wants Data on (Q & A)	Feb.	115
Large Bronze Tablet	Dec.	130
Matchplates for Small Brass Castings (Q & A)	Nov.	128
...earmotor, Announces	Oct.	278
General American Transportation Corp. Develops Nickel Plating Process (FD)	May	200
General Blower Co. Offers Roof Exhauster	Aug.	225
General Electric Co.		
Carboloy Department Opens Magnet Plant	Nov.	184
Electrode, Announces Welding	May	329
Motor, Announces Polyphase Alternating Current	Dec.	231
Photometer, Announces X-ray	Aug.	222
Power Plug, Announces	Sept.	289
Powerful X-ray Machine, Installs	Oct.	222
Relays, Announces Standardized	June	269
Putty Paste, Develops Silicone (FD)	May	200
Shell Molding Materials, Offers	Apr.	222
Trumbull Electric Dept. Offers Safety Switch	Jan.	237
Welding Control, Announces	Oct.	271
X-ray Device, Develops New	Dec.	147
X-ray Diffraction Course, Announces	Sept.	33
General Motors Corporation		
Buick Division Continues Mechanization	Feb.	173
Helicopter Aids Repair Work for (FD)	Aug.	140
Institute Adds New Facilities	May	352
JIC Electrical Standards Revision, Issues	Sept.	270
Public Relations Guidebook, Issues	Nov.	281
General Scientific Equipment Co. Offers Light Unit	Apr.	229
German Foundry Progress	Sept.	114
Gerotor May Corp. Offers Bin-Flow Device	Sept.	284
Gifford-Wood Co. Offers Conveyor System	Jan.	236
Glassware Molds, Cracking Shortens Life of (Q & A)	Oct.	132
Glauconite Is Green Mineral (Q & A)	Apr.	120
Glidden Co. Develops Silicone Resin Finish (FD)	May	200
Glidden Co. Studies Use of Copper Oxides	Sept.	228
Globemaster, Helicopter Fits in Compartment of	June	198
Glove Coating, Announces Work	Feb.	240
Gloves, Announces Plastic-Coated	Aug.	222
Gloves with Leather Fingers, Offers	Feb.	236
Goggles		
Chipping and Welding, Offers	Oct.	275
Chipping-Welding, Announces	Feb.	238
Cup Type, Offers Chippers' and Welders'	Nov.	266
For Chemical and Electrical Plants, Develops	Apr.	229
For Chipping and Grinding, Offers	Apr.	231
Heat-Resistant, Offers	Mar.	347
Welding, Announces Fog-Proof	Nov.	259
With Frontal and Lateral Protection, Offers	Feb.	233
Goldsmith, C. A., Co. Acquires Atlas Foundry Co.	Mar.	238
Goodrich, B. F., Co. Develops Insulating Spray	Oct.	276
Good Will with Neighbors and Employees	Aug.	111
Goodall Rubber Co. Offers Conveyor Belting	Aug.	220
Goodrich, B. F., Co. Announces Air Hose	Sept.	273
Goodyear Tire & Rubber Co. Installs Huge Press	Jan.	152
Gordon, Claud S., Co. Offers Thermocouple Head	Sept.	296
Gould-National Batteries Inc. Explains Sulphation (FD)	Oct.	171
Grab, Announces Load	July	255
Grain Refinement		
Of Aluminum-Silicon (FD)	Feb.	146
Of Cast Copper-Aluminum (FD)	Sept.	192
Of Magnesium Castings	Feb.	98
Graphite Spherulite Formation and Growth	Nov.	100
Gray Cast Iron Fluidity Test Applications	Aug.	94
Gray Iron Castings	May	118
Gray Iron Castings Show Hardness Variations (Q & A)	Oct.	133
Gray Iron Founders' Society		
Core Department Costing, Explains	July	183
Cost Manual Preprint, Publishes	Oct.	176
Elects Officers at Annual Meeting	Nov.	144
Pattern Loss Investigation, Conducts	Feb.	152
Quarter Century of Progress, Marks	Oct.	126
Redesign Contest Prizes, Offers	June	204
Tentative Program 25th Anniversary Meeting	Sept.	240
Gray Iron Machinability, Annealing Improves (I)	Dec.	108
Gray Iron Metallurgy, Calcium Carbide Injection in	Apr.	86
Gray Iron Research Institute Operators Meet	Aug.	196
Gray Iron, Stress Relief of	Aug. 112; Sept.	128
Grease, Announces Multipurpose	Feb.	243
Grease Fitting Cover, Announces	Nov.	254
Greenlee Bros. & Co. Installs Air Conditioner	July	184
Griffin Wheel Co. Develops Cast Steel Carwheel (FD)	June 172; Aug.	140
Grinder		
Aerial, Announces	Sept.	273
Angle, Announces	June	257
Conveyorized, Offers	Jan.	244
Gasoline Engine-Powered, Develops	Nov.	265
General-purpose, Announces	Sept.	272
Handles Skim Cores at High Production Rate	Sept.	168
Portable Air-Driven Belt, Offers	Oct.	285
Grinder Hood Design Improves Dust Suppression	Aug.	226
Grinding Balls, Wants Method for Chilled (Q & A)	Oct.	134
Grinding, Determining Power and Pressure in	Jan.	112
Grinding Wheel Institute Issues Safety Data	Sept.	262
Grinding Wheel Institute Meets	Jan.	261
Grinding Wheels, Speed Ranges of (Q & A)	Feb.	116
Grindle Corp. Develops Hot Blast Cupola	May	315
Grindle Corp. Offers Flowmeter	Dec.	244
Gr...		
...r Cleaning, Announces	Nov.	255
...r Refractory Materials, Offers	May	324
...ver Type Grease, Announces	May	324
Gun Mix, Offers	Apr.	222
Gustin-Bacon Mfg. Co. Offers Pipe Insulation	Sept.	290

H

	Issue	Page
Haloid Co. Develops New X-ray Device	Dec.	147
Hamilton Rubber Mfg. Corp. Offers All-Purpose Hose	Oct.	273
Hammer, Offers Scaling	July	252
Hammond Machinery Builders Inc. Offers Lathe	May	314
Hand Cleaner, Announces	Aug.	214
Handling Devices Co. Offers Sweeper Attachment	Oct.	282
Handpiece, Offers Quick Change	Dec.	231
Harbison-Walker Refractories Co. Opens New Plant	Sept.	186
Hard-Facing Alloy Protects Conveyor Hooks (FD)	Nov.	170
Hard Spots Occur in Gray Iron Castings (Q & A)	Oct.	133
Hardness Tester		
Direct Dial Reading, Offers	Feb.	229
For Ferrous and Nonferrous Metals, Offers	Mar.	352
Lightweight Portable, Designs	Mar.	340
Pocket-Sized, Announces	Nov.	262
Harnischfeger Corp. Offers Electric Hoist	Aug.	225
Hat, Announces Safety	June	263
Hat, Offers Safety	Feb.	239
Haynes Stellite Division Casts Motor Mount (FD)	Aug.	140
Heat Machine Panel, Announces	Dec.	245
Heat Resistant Gray Iron Castings, Wants (Q & A)	June	138
Heat Treating Textbook, Revises	Mar.	337
Heat Treatment of Steel Castings	Oct. 122; Nov. 124; Dec.	126
Heater		
Electric Circulation, Offers	May	335
Gas-Fired Space, Announces	June	262
Industrial, Offers Large Area	Mar.	347
Heating System Improves Working Conditions	May	288
Heidrich-Nourse Co. Announces Impact Press	Dec.	238
Helicopter Aids in Repairing Chimney Rising (FD)	Aug.	140
Helicopter Fits in Globemaster Cargo Compartment	June	198
Helmet, Announces Arc Welding	Sept.	288
Helmet, Offers Fiberglas	Apr.	237
Hewitt-Robbins Inc. Offers Rubber Hose	Aug.	221
High Pressure Molding, Studies	Aug.	146
High-Alloy Castings Conference, Holds	Sept.	252
High-Speed Molding Is Done Automatically	Apr.	98
Hoist		
Air Cylinder, Announces	Sept.	294
Battery-Operated, Announces	Dec.	236
Deck Type Electric, Offers	Jan.	246
Roller Chain Type Air, Announces	July	257
Spur Gear, Announces	Nov.	265
With Rope Control, Offers Electric	Aug.	225
Holoal Mfg. Corp. Offers Pipe Clamp	Nov.	255
Holes Appear in Bronze Bushings (Q & A)	Apr.	117
Hollingshead, R. M., Corp. Offers Release Agent	July	247
Homestrand Inc. Offers Dial Indicator	May	339
Hook, Announces Safety	Dec.	237
Hooker Electrochemical Co. Builds Michigan Plant	June	247
Hopper, Announces Self-Dumping	Nov.	260
Hose		
All-Purpose Rubber, Announces	Oct.	273
Heavy Duty Air, Announces	Sept.	273
High Pressure Rubber, Offers	Jan.	241
Lightweight Rubber, Offers	Aug.	221
Wire-Reinforced Utility, Offers	Dec.	246
Hot Plate, Offers Portable	Oct.	273
Houghton, E. F., & Co. Announces Lubricant	Apr.	222
Houghton, E. F., & Co. Offers Hydraulic Fluid	Dec.	232
How Are Your Prices? (Ed)	Aug.	85
How To Avoid Trouble in the Aluminum Foundry	Dec.	102
How To Do It: Jan. 146; Feb. 144; Mar. 278; Apr. 200; May 195; June 210; July 170; Aug. 199; Sept. 168; Oct. 152; Nov. 242; Dec. 156		
Howe Scale Co. Announces Weight Recorder	Sept.	289
How's Your Quality Rating? (Ed)	July	83
Hughes-Keenan Corp. Designs Gas-Powered Motive Crane	Nov.	265
Humidity Affects Aluminum Alloy Castings (FD)	June	172
Hydraulic Fluid, Announces	Dec.	232
Hydroway Scales Inc. Offers Batching Scale	May	314
Hygiene Research Inc. Offers Glass Cleaner	Oct.	274

I

	Issue	Page
I. F. Sales Co., Induction Melting at	July	108
Ideal Industries Inc. Offers Voltage Tester	Sept.	292
"Ideal" Steel Jobbing Foundry, The (Part II)	Jan.	102
Ideas for Foundrymen: Jan. 239; Feb. 231; Mar. 341; Apr. 225; May 316; June 259; July 249; Aug. 217; Sept. 275; Oct. 269; Nov. 256; Dec. 233		
Idler		
Conveyor Belt Training Return, Develops	Oct.	279
Heavy Duty Belt Conveyor, Offers	Oct.	275
Prelubricated Belt Conveyor, Announces	Mar.	347
Immersion Thermocouple, Designing a	Aug.	193
Impregnation Machine, Offers	May	339
Independent Pneumatic Tool Co. Completes 60th Year	Mar.	337
Indexing Patterns and Equipment, "Bill" Discusses	Sept.	245
India, Provides Technical Aid for Foundries of	Sept.	154
Indiana Steel Products Co. Increases Magnet Output	Dec.	175
Indianapolis Clears the Air	May	212
Indianapolis Foundries, High School Students Visit	Aug.	190
Indicator		
Bin Level, Announces	Aug.	216
Bin Level, Announces	Oct.	268
Dial, Designs	May	339
High Temperature, Offers	Nov.	254
Potentiometer, Offers	Apr.	223
Induction Melting in a Nonferrous Jobbing Foundry	Apr.	102
Induction Melting, Low-Frequency	July	108
Industrial Equipment Bench & Mfg. Co. Offers Welding Bench	Nov.	256
Industrial Furnace Manufacturers Association Issues Speakers Directory	Dec.	226
Industrial Heating Award Winners, Announces	June	187
Industrial Management Society Offers Clinic Proceedings	Feb.	170
Industrial Management Society Plans Time Study Clinic	Aug.	156

	Issue	Page
Industrial Products Co. Offers Antifog Liquid	Mar.	339
Industrial Safety Specialties Co. Offers Fireproof Suit	Dec.	241
Industry Advisory Committees, Government Needs (Ed)	Feb.	85
Industry Briefs: Jan. 180; Feb. 156; Mar. 232; Apr. 156; May 247; July 204; Aug. 171; Sept. 170; Oct. 200; Nov. 172; Dec. 172		310; 194;
Industry Must Serve (Ed)	Nov.	99
Ingersoll-Rand Announces Angle Grinder	June	257
Ingot Brass and Bronze Shipments: Jan. 130; Feb. 130; Mar. Apr. 134; May 188; June 196; July 176; Aug. 144; Sept. Oct. 162; Nov. 152; Dec. 160		228; 160;
Ingot Molds, Offers	Aug.	224
Ink, Offers Fast Drying Marking	Feb.	238
Inspectroscope Examines Cavities (FD)	Sept.	192
Institute of British Foundrymen Holds Annual Meeting	Aug.	176
Institute of British Foundrymen Conference Papers	Sept.	194
Instrumentation, Research and Development in (FD)	Nov.	170
Interlake Iron Corp. Enlarges Blast Furnaces	Mar.	238
International Correspondence Schools Revises Heat Treating Textbook	Mar.	337
International Foundry Congress		
European Tours, Arranges	Mar.	278
Foundrymen from 23 Nations, Attracts	Nov.	106
Paris Is Host to	Sept.	118
Technical Reports at the	Dec.	125
Tentative Program for 1953	Jan.	151
International Harvester Co.		
Automatic Core Production Machine, Uses	May	326
Grinder, Develops Automatic	Sept.	168
Vendor's Day Programs, Holds	Dec.	178
International Molding Machine Co. Offers Air Draw Unit	May	314
International Molding Machine Co. Offers Rollover Unit	June	261
International Nickel Co. Joins Castings Conference	Sept.	252
International Nickel Co. of Canada Ltd. Makes Diamond Drill Bits (FD)	Dec.	167
Investment Casting, Plastic Patterns for	Sept.	120
Investment Casting Process	Jan.	86
Iridium Sources, Announces	Aug.	223
Iron and Steel Directory Lists British Firms	Sept.	304
Iron and Steel Scrap Consumption: Jan. 130; Feb. 130; Mar. Apr. 134; May 188; June 196; July 176; Aug. 144; Sept. Oct. 162; Nov. 152; Dec. 160		228; 160;
Iron Lung Ventilator Co. Moves Offices	Mar.	276
Iron Pot, Don't Melt Brass in (Q & A)	Feb.	115
Irrigation Fitting Cores Give Trouble (Q & A)	Sept.	140
Irrigation Fittings Require Skill (Q & A)	Aug.	118
Italian Foundry Progress	Sept.	110

J

Jackson & Church Co. Announces Furnace	May	343
Jackson & Church Co. Offers Suspension Furnace	Feb.	240
Jackson Products Offers Electrode Holder	June	258
Jackson Products Offers Welding Helmet	Sept.	288
Jaeger Machine Co. Offers Tractor Shovel	June	264
Jet Plane Parts Cast Centrifugally	Sept.	202
Jobbing Foundries, Modern Coreroom in	June	118
Jobbing Foundries, Safety in	June	113
Johnston Mfg. Co. Offers Brass Melting Furnace	Oct.	268
Joint Industry Conference Revises Standards	Sept.	270
Jones & Laughlin Steel Corp. Offers Wire Rope	July	254
Jones Metal Products Co. Offers Reflector	May	343

K

Keep the Scrap at Home! (Ed)	Dec.	101
Kelite Products Inc. Offers Cleaning Spray	May	330
Kent, George, Ltd. Opens New Foundry	Feb.	136
Kettles, Molding Gray Iron (Q & A)	May	163
Kewanee Mfg. Co. Builds Hydraulic Truck Unloader	Apr.	170
Kidde, Walter, & Co. Announces Fire Extinguisher	May	342
Kidde, Walter, & Co. Offers Power Failure Alarm	Dec.	242
Kindt-Collins Co. Announces Plastic Fillet	Jan.	237
Knapp, James H., Co. Moves to New Plant	Dec.	172
Koehring Southern Co. Holds Open House	July	204

L

Labor Contract Terms Glossary, Issues	Aug.	244
Ladle, Hook Facilitates Transfer of	May	195
Ladle Stopper, Announces	May	314
Lamp, Offers Mercury	July	247
Lamp, Offers Ultraviolet	May	341
Lamp Post Chaplets, Anchoring (Q & A)	May	162
Lamson Corp. Offers Chain Drive Overload	Nov.	261
Lanthanum-Cerium Additions to Steel (FD)	Jan.	142
Late Foundry News	Jan.—Dec.	33
Lathe, Announces Polishing	May	315
Lawley Granite Surface Plate Co. Offers Plates	Feb.	241
Layout, Aluminum Match Plate Corp.	Nov.	116
Layout, Production Pattern & Foundry Co.	June	108
Leakers in Copper-Base Alloys, Phosphorus Decreases (FD)	June	172
Lebanon Steel Foundry		
Film Abroad, Shows	Jan.	196
For Defense Work, Honors	Feb.	176
Jet Plane Parts Centrifugally, Casts	Sept.	202
Leeds & Northrup Co. Offers Heat Treating Furnace	Dec.	230
Lehigh Foundries Inc., Shell Production at	July	88
Lehigh Foundries Inc. Designs Air Cylinder Hoist	Sept.	294
Lens Cleaner, Announces	May	316
Lenses, Announces Protective	Aug.	220
Leschen, A., & Sons Rope Co. Offers Sling	June	256
Leschen, A., & Sons Offers Wire Rope	Feb.	230
Let's Change Our Thinking (Ed)	May	115
Let's Make It a Branch Now (Ed)	June	101
Let's Sell Intelligently (Ed)	Jan.	85
Letter Copier, Announces	July	254
Lewis Welding & Engineering Co. Develops Die Casting Machine	Apr.	223
Lift Truck Drive, Announces	Nov.	255
Lift Trucks Inc. Announces Unit	May	314
Lift Unit, Offers Battery-Powered	Aug.	214
Light, Announces Photoelectric	July	254
Light, Offers Inspection	Sept.	284
Light-Metal Alloys, Casting	June	114
Lighting Fixture, Announces	June	266
Lighting Guide, Issues Industrial	Jan.	182
Lighting Specifications, Publishes	Sept.	174
Lighting Unit, Announces Emergency	Apr.	224
Lightning, Booklet Describes Dangers of	Aug.	264
Lime for Slagmaking Causes Trouble, Damp (FD)	Jan.	142
Lincoln Engineering Co. Offers Grease Gun	May	324
Lindberg Engineering Co. Offers Hot Plate	Oct.	273
Lindberg Steel Treating Co. Expands in Los Angeles	Jan.	185
Linde Air Products Co.		
Blowpipe, Develops Welding	Apr.	227
Cutting Torch, Announces	Jan.	227
Goggles, Offers Welding	Nov.	259
Powder Lance, Announces	Oct.	277
Powdered Metal Coatings, Offers	Aug.	215
Welding Heads, Offers	Mar.	335
Welding Torch, Designs	Feb.	234
Link-Belt Co. Offers Shakeout	July	251
Link-Belt Co. Opens Colmar, Pa., Plant	Jan.	172
Lintern Corp. Develops Cooling Crane Cab	May	326
Loader, Announces Materials	May	328
Loader, Offers Hydraulic	Sept.	274
Loading Dock, Announces Magnesium	Sept.	295
Loading Dock, Offers Steel	Oct.	273
Locker Rack, Announces	Dec.	236
Loomis Machine Co. Announces Loading Dock	Oct.	273
Los Angeles Chapter of the AFS Plans Metal Congress Program	Feb.	217
Low-Frequency Induction Melting	July	108
Lubricant, Offers Molybdenum Disulphide	Apr.	222
Lubrication, Offers Automatic	Nov.	255
Lubricator		
Conveyor, Offers	Apr.	227
Filter Regulator, Develops	Sept.	273
Pneumatic, Announces	Sept.	292
Lynchburg Foundry Co., Quality Control at	Oct.	110
Lyon Metal Products Inc. Offers Locker Rack	Dec.	236

M

M & E Mfg. Co. Offers Roof Ventilator	July	256
M-H Standard Co. Offers Metal Belt Conveyor	Oct.	282
M. F. I. Inc. Distributes Boxcar Unloader	Mar.	339
Machinability, Annealing Improves Gray Iron (I)	Dec.	108
Machine Tool Base, "Bill" Discusses	July	234
Machined Castings Show Dirt (Q & A)	June	136
Machinery Cleaner, Announces	Feb.	243
Machinery Directory, Revises Metalworking	Sept.	33
Machining on Castings, How To Eliminate Some (ABC)	June	215
Mackintosh-Hemphill Co. Observes Sesquicentennial	Dec.	267
Magline Inc.		
Barrel Skid, Develops	Feb.	240
Conveyor System, Offers Roller	Dec.	230
Hand Truck, Offers	July	253
Loading Ramp, Announces	Oct.	274
Magnaflux Corp.		
Dye Penetrant, Announces	May	322
Meter, Announces Conductivity	Dec.	239
New Plant, Occupies	Sept.	190
Magne-Grip Tool Co. Offers Vise Jaws	Feb.	237
Magnesium Alloys, Creep Resistance of (FD)	Mar.	230
Magnesium Association		
Annual Meeting, Holds 9th	Dec.	225
Annual Meeting, Plans	Nov.	166
Casting Division Holds Annual Meeting	July	208
International Exposition, Sponsors	May	206
Officers, Elects	Jan.	206
Magnesium Castings		
For Aircraft, Production of	May	146
Grain Refinement of	Feb.	98
Shell Molding of	Mar.	336
Magnesium Co. of America Announces Loading Dock	Sept.	295
Magnesium Co. of America Offers Hand Truck	July	258
Magnesium Ingot, Announces	July	254
Magnesium-Aluminum Alloy, Solution Treatment of (FD)	Aug.	140
Magnet, Announces Plate	May	322
Magnet, Announces Truck	Nov.	259
Magnetometer, Cast Spheres Contain (FD)	Sept.	192
Mall Tool Co. Announces Aerial Grinder	Sept.	273
Malleable Founders' Society		
Annual Meeting, Holds	Aug.	130
Castings Tolerances and Specifications, Issues	Dec.	164
Fall Industry Meeting, Holds	Nov.	163
Malleable Industry Booklet, Offers	July	224
Market Development Conference, Holds	June	178
Market Development Conference, Plans	Apr.	158
Safety Letter Contest, Sponsors	Nov.	260
Self-Improvement Awards, Makes	May 349; June	234
Semiannual Meeting, Holds	Mar.	222
Malleable Iron Castings	May	140
Malleablization, Mechanism of Second-Stage	Oct.	108
Man-to-Man on the Molder's Bench: Jan. 148; Feb. 142; Mar. Apr. 136; May 236; June 207; July 180; Aug. 165; Sept. Oct. 166; Nov. 239; Dec. 168		274; 208;
Manganese-Bronze Castings, Powdercutting (FD)	July	160
Manganese Steel Castings in Shell Molds (Q & A)	June	134
Manifold, Brinell Too High in Iron (Q & A)	Jan.	115
Manitoba Chapter of the ASM Studies Gray Iron	Jan.	223
Manning, Maxwell & Moore Inc. Offers Electric Hoist	Dec.	236
Manufacturers' Agents Elect Cleveland Officers	May	287
Marion Malleable Iron Works, Three Brothers Serve	Oct.	250
Market Development Conference, Holds	June	178
Market Forge Co. Develops Revolving Crane Truck	Dec.	239
Martin Engineering Co. Offers Corebox Material	June	262
Martin, Joe, Co. Offers Metal Storage Units	Oct.	276
Massachusetts Institute of Technology Chapter of the AFS Stimulates Foundry Interest	June	232
Massachusetts Institute of Technology Offers Physical Metallurgy Course	June	280
Massachusetts Institute of Technology Holds Light Metals		

	Issue	Page
Course	July	244
Matchplates, Follow Boards and (ABC) Aug. 195; Sept. 255; Oct. 197; Nov. 287		
Matchplates for Brass Castings, Gating (Q & A)	Nov.	128
Materials Handling Institute		
Cost Book, Offers	Apr.	248
Exposition, Holds 5th Annual	July	218
Exposition, Plans	May	182
Integration Booklet, Announces	Dec.	192
Road Clinic, Plans	Apr.	213
Traveling Clinic in New York, Sponsors	May	348
Materials Handling Aids Jobbing Operations	Feb.	178
Materials Handling Articles, Offers	May	182
Materials Handling Conference, Holds	July	218
Materials Handling Exposition Program	May	182
Materials Handling Show To Tour Country	Apr.	144
Mathews Conveyer Co. Offers Trolley Conveyor	July	248
May-Fran Engineering Inc. Develops Belting	May	321
May-Fran Engineering Inc. Redesigns Belt Link	Dec.	236
Mead Specialties Co. Announces Crawler Tractor	Apr.	230
Mead Specialties Co. Offers Air Clamp	May	334
Mechanical Handling Systems Inc. Offers Shell Molding Machine	Apr.	229
Mechanical Products Inc. Offers Circuit Breaker	Feb.	236
Mechanism of Second-Stage Malleablization	Oct.	108
Meeting Calendar, Technical Societies: Jan. 165; Feb. 141; Mar. 348; Apr. 138; May 181; June 201; July 178; Aug. 137; Sept. 215; Oct. 203; Nov. 166; Dec. 147		
Meeting Competition with Good Cost Methods (Part II)	Jan.	108
Melting		
At Ford's Cleveland Foundry	Mar.	166
Bronze Continuously (Q & A)	Mar.	200
Figure on Cost of, Wants (Q & A)	Sept.	138
Lime Pebbles Causes Problem in	Jan.	142
Low-Frequency Induction	July	108
Records Check Dangers in Nonferrous (FD)	Dec.	167
Memorial To Honor U. S. Marine Corps	Oct.	104
Men of Industry: Jan. 120; Feb. 120; Mar. 204; Apr. 122; May 168; June 140; July 118; Aug. 122; Sept. 142; Oct. 138; Nov. 134; Dec. 136		
Mercury Mfg. Co.		
Cargo Handling Trailer, Develops	July	246
Furnace Charger Truck, Announces	Jan.	248
Truck Trailer, Offers	Mar.	353
Meta-Mold Aluminum Co. Conducts Art Show	June 188; Aug.	154
Metal Loss in Melting Brass, Reduce (Q & A)	May	162
Metal Powders Discussions, Issues	Sept.	204
Metal Testing Kit, Announces	Nov.	254
Metallurgical Enterprises Offers Rare Earths	July	246
Metallizing Engineering Co. Offers Film	Jan.	273
Metals Disintegrating Co. Publishes Abrasives Book	June	187
Metalworking Organizations Plan 1953 Congress	Oct.	147
Meter, Announces Conductivity	Dec.	239
Meter, Offers Engine Hour	Sept.	289
Metropolitan Brass Founders' Association		
Foundry Practice Course, Announces Fall	Sept.	204
Foundry Practice Course, Announces Spring	May	274
Officers, Elects	Mar.	248
Metropolitan Chapter of the AFS		
Brooklyn Polytechnic Institute Student Chapter, Installs	Mar.	242
Christmas Party, Holds	Feb.	217
Cupola Operations, Studies Control of	Feb.	202
Non-destructive Testing, Considers	July	194
Reclaiming Castings, Studies	May	266
Shell Molding Process, Considers	Apr.	176
Mexico Refractories Co. Awards Service Pins	Nov.	289
Mexico Refractories Co. Honors Veteran Employees	Dec.	150
Meyer Corp. Offers General Purpose Gage	Sept.	288
Michiana Chapter of the AFS Holds Round-table Meeting	Apr.	176
Michiana Chapter of the AFS Plans Casting Congress	Oct.	232
Michigan AFS Chapters Enter Career Carnival	Feb.	166
Michigan Crane & Conveyor Co. Offers Furnace Loader	Aug.	214
Michigan Oven Co. Offers Core Oven	May	332
Michigan Regional Foundry Conference, Holds	Dec.	162
Michigan State College		
Engineering Career Film, Develops	Nov.	277
FEF Advisory Committee Meets	Mar. 240; Mar.	251
Ventilation Course, Offers	Jan.	260
Michigan State Student Chapter of the AFS		
Arc Welding Demonstration, Sees	May	272
Lost-Wax Process, Studies	Feb.	212
Officers, Elects	Aug.	188
Michigan Steel Castings Co. Investment Foundry	Jan.	86
Micrometer Check Set, Announces	Oct.	281
Microscope		
Metallurgical, Announces	Aug.	220
Stereoscopic, Designs	Nov.	264
Universal, Develops	June	267
Mid-South Chapter of the AFS Holds First Meeting	Jan.	214
Midwest Foundry Co., Investment Casting at	Sept.	120
Midwest Foundry Co., Modern Coreroom at	June	118
Milling Machine, Announces Patternmakers'	July	246
Milwaukee Shipbuilding Corp. Offers Scarfing Equipment	Sept.	280
Mine Safety Appliances Co. Offers Respirator	Sept.	274
Minneapolis-Honeywell Regulator Co. Offers Detector	Jan.	238
Minnesota Mining & Mfg. Co. Offers Film Data	Oct.	225
Missouri School of Mines		
Baby Cupola, Uses	June	198
Industrial Advisory Committee Meets, FEF	Jan.	216
Industrial Advisory Committee Meets, FEF	Dec.	178
Mitt, Offers Hot Materials	Nov.	254
Mixer, Announces Gearhead	Mar.	353
Moak Machine & Tool Co. Offers Band Saw	Sept.	280
Mobile Foundry, Army Engineers Operate	Dec.	112
Modernizing Steel Jobbing Foundry (Part II)	Jan.	102
Moisture Determiner, Announces	June	256
Moisture's Effect on Foundry Sand Dust (FD)	Feb.	146
Mo-Kan Chapter of the AFS		
Officers, Elects	Sept.	240
Safety Analysis, Studies	Nov.	226
Shell Molding, Considers	Dec.	215
Mold Blower, Announces	Oct.	266
Mold Blower Provides High Production Rate	Nov.	190
Mold Design for Casting Steel in Sand (FD)	July	160
Mold Design for Steel Castings	Oct.	242
Mold, Pouring Time for Gray Iron	Aug.	205
Mold Wash, Adds Wetting Agent to (FD)	Jan.	142
Mold Wash Dryer, Announces	Oct.	267
Molding		
At Ford's Cleveland Foundry	Mar.	158
Automatic High Speed	Apr.	98
"Bill" Discusses Pit	Dec.	196
High-Pressure, Studies (FD)	Apr.	160
High-Pressure, Studies	Mar. 307; Aug.	146
Molding Machine		
Air Rollover Draw, Announces	June	261
Air Rollover, Offers	May	314
Frame Holds Quick Change Pattern Boards for	Aug.	199
Ralph Lee Develops	Jan.	171
Rotary Automatic, Develops	Oct.	238
Shell, Announces Automatic	Apr.	229
With Rubber Diaphragm, Offers	Feb.	229
Molding Machines Incorporate Automatic Features (FD)	Jan.	142
Molding System, Operates Automatic	Dec.	154
Molding Unit, Develops Continuous Automatic	Apr.	222
Monarch Machine Shop Inc. Offers Abrasive File	Aug.	214
Monorail Drive Unit, Offers	May	316
Monroe Co.		
Plastic Compound, Develops	Mar.	348
Silicone Roof Coating, Announces	Sept.	294
Waterproofing Paint, Offers	July	256
Monsanto Chemical Co. Announces Resin	Apr.	224
Morse Chain Co. Develops Sprocket	May	325
Morrison Products Inc. Announces Wheel Guard	Dec.	245
Morrison Steel Products Inc. Offers Steel Box	June	258
Mortar Mixers, Offers	Feb.	228
Moto-Truc Co. Announces Tractor	July	252
Moto-Truc Offers Tractor	May	241
Motor, Announces Alternating Current	Dec.	231
Motor Castings Co. Studies High-Pressure Molding (FD)	Apr.	160
Motor Generator Corp. Offers Battery Charger	Sept.	294
Motor Mount, Develops Investment-Cast (FD)	Aug.	140
Motor, Offers Variable Speed	Feb.	234
Motor Reducer, Announces	May	343
Motor Reducer, Offers	Oct.	272
Muffler, Offers Fork Truck	June	268
Muller Features Plow Design and Construction	May	332
Muller for Laboratory Testing, Offers	May	322
Muller Machinery Co. Offers Mortar Mixers	Feb.	228
Mullite Ladle Lining, Discusses (Q & A)	Mar.	202
Multifinish Mfg. Co. Offers Sweeper	July	252
Mystik Adhesive Products Offers Filament Tape	Nov.	266

N

National Bureau of Standards Issues Annual Report	Sept.	262
National Carbon Co. Offers Electrodes	May	315
National Carbon Co. Offers Ingot Molds	Aug.	224
National Castings Council Elects Officers	June	201
National Cylinder Gas Co. Announces Torch	Mar.	354
National Cylinder Gas Co. Offers Cutting Unit	Jan.	251
National Defense, Importance of Carbon in the	Nov.	278
National Engineering Co. Announces Sand Muller	May	322
National Engineering Co. Offers Sand Reclamation Unit	July	247
National Foremen's Institute Publishes Booklet	Feb.	255
National Foremen's Institute Studies Variations	Aug.	190
National Foundry Association Holds Annual Meeting	Nov.	154
National Foundry Association Plans Annual Meeting	Sept.	176
National Gypsum Co. Offers Safety Films	Jan.	204
National Instrument Co. Offers Spectrometer	Mar.	356
National Malleable & Steel Castings Co.		
Hydraulic Tester, Installs	July	221
Scholarship Funds, Establishes	Sept	33
Technical Center, Opens New	Dec.	152
National Metal Congress, Holds 1952	Jan.	174
National Metal Congress, Holds 1953	Dec.	181
National Metal Congress, Plans 1953	Oct.	147
National Metal Trades Association Revises Film Bibliography	Jan.	151
National Production Authority, BDSA Succeeds	Nov.	33
National Production Authority, To Discontinue (Ed)	June	101
National Radiator Co. Sponsors Scholarships	Oct.	164
Natinal Research Corp. Cast Alloy-Titanium (FD)	Oct.	171
National Safety Council		
Accident Frequency Rates, Announces	Oct.	252
Accident Prevention Handbook, Offers	Sept.	218
Accident Rate Booklet, Offers	Dec.	251
Award of Honor Plaque, Presents	July	185
Awards, Presents Trade Association	Nov.	291
Safety Congress, Plans	Oct.	253
Safety Courses, Offers	Mar.	327
Safety Films, Announces	Mar.	356
Safety Films Directory, Issues	Sept.	252
Safety Poster Directory, Issues	June	248
National Supply Co.		
Employee Designs Tool Carrier at	Jan.	152
Pump Casing, Builds Large	Oct.	186
Valve Assembly, Builds Huge	Nov.	168
Naval Ordnance Test Station's Casting Laboratory	Aug.	148
Neenah Foundry Co., Sand Moisture Control at	Nov.	120
Netherlands, Foundry Progress in the	Sept.	112
New England Foundrymen's Association		
Jobbing Foundry Operations Film, Sees	May	260
MIT Foundry Laboratory, Visits	Jan.	216
Mechanization in Molding, Studies	Apr.	189
Meehanite Castings, Considers	Feb.	210
Officers, Elects	Mar.	246
Regional Foundry Conference, Holds	Dec.	220
Shell Molding, Considers	Nov.	224
New Jersey Foundrymen's Association		
Foundry Modernization, Studies	Jan.	214
Incentive Methods, Considers	May	286
Quality Control and Merchandising, Studies	Apr.	189
Newage International Inc. Offers Hardness Tester	Feb.	229
New Zealand Steel Foundry Plants	July	226
News Views: Jan. 152; Feb. 136; Apr. 170; May 198; June 198; July 184; Sept. 268; Oct. 164; Nov. 168; Dec. 150		
Niagara Blower Co. Offers After Cooler	Aug.	223

	Issue	Page
Niagara Frontier Regional Conference, Holds	Nov.	207
Niagara Frontier Regional Foundry Conference, Plans	Sept.	238
Nickel Plating Process, New (FD)	May	200
Nissen, John P., Jr. Co. Offers Marking Ink	Feb.	238
Nitrogen Additions to Molten Cast Iron (FD)	Nov.	170
Nitrogen To Degas Copper-Base Alloy, Use of (Q & A)	Nov.	129
Nodular Graphite Castings, Gas Welding (FD)	Feb.	146
Nodular Graphite in Cast Iron, Japanese Investigate (FD)	Mar.	230
Nodular Graphite Iron, Spherulite Formation in	Nov.	100
Nodular Iron Castings		
Applies Shell Molding to (FD)	May	200
Ductile Properties of Ferritic (FD)	June	172
Subsurface Pinholing in, Studies (FD)	Aug.	140
Noise, Issues Data for Checking (FD)	Oct.	171
Nonferrous Alloys, Brinell Hardness Numbers of (Data Sheet)	May 203.	204
Nonferrous Founders' Society		
Annual Meeting, Holds	June	202
Annual Meeting and 10th Anniversary, Plans	Apr.	238
Chicago Chapter Acts on Foundry Thefts	Apr.	148
Cleveland Chapter Discusses Shell Molding	Mar.	273
Cleveland Chapter Holds Annual Clam Bake	Dec.	218
Cleveland Chapter Elects Officers	May	260
Cleveland Chapter Studies Inspection Problems	July	200
Sales Terms for Nonferrous Castings, Develops	Feb.	222
Southern California Chapter Studies Shell Molding	July	190
Ten Years of Service, Celebrates	Apr.	114
Nonferrous Foundry, Induction Melting In a	Apr.	102
Nonferrous Foundry Practice	Aug.	108
North American Mfg. Co.		
Blower, Offers Volume	Mar.	354
Furnace Shutoff, Develops	Apr.	229
Gas-Burner, Announces Nozzle-Mixing	May	322
Valve, Offers Safety Shutoff	Dec.	235
Northeastern Ohio Chapter of the AFS		
Casting Defects, Considers	Jan.	218
Dietert Sand School, Presents	Mar.	264
Light Alloys and Function of Risers, Studies	June	227
National Officers' Night, Holds	May	276
Officers, Elects	Aug.	185
Quality Control, Considers	Nov.	226
Northern California Chapter of the AFS		
Future of the Foundry Industry, Studies	Feb.	210
Regional Foundry Conference, Holds	Feb.	168
Smoke Abatement, Considers	June	230
Northwest Regional Conference		
Northwest Regional Conference, Plans	July 187; Oct.	230
Northwestern Pennsylvania Chapter of the AFS		
Ajax Iron Works, Visits	June	234
Casting Defects, Considers	July	194
Father and Son Night, Holds	May	286
Material Handling in the Foundry, Studies	Feb.	200
Metallurgy and Cupola Operation Course, Plans	Oct.	230
National Officers' Meeting, Holds	Jan.	218
Pattern Engineering, Considers	Nov.	228
Sand Schools, Plans 4-Day	Apr.	181
Norton Co. Designs Cutoff Wheel	Dec.	241
Norton Co. Publishes Company History	June	255
Nozzle, Announces Fog	June	258
Nozzle, Develops Refractory Gun	Oct.	272
Nugent Sand Co. Announces Foundry Sand	July	247

O

	Issue	Page
Oberdorfer Foundries Inc., Use of Shell Cores at	Dec.	114
Obituary:	Jan. 185; Feb. 134; Mar. 158; Apr. 158; May 306; June 210; July 206; Aug. 168; Sept. 190; Oct. 224; Nov. 173; Dec. 170	
Ohaus Scale Corp. Offers Balance	June	261
Oil Burner, Announces	Jan.	236
Ohio Crankshaft Co. Moves Tocco Division	Apr.	220
Ohio Regional Foundry Conference, Holds	Nov.	272
Ohio Regional Foundry Conference, Plans	Sept.	204
Ohio State Student Chapter of the AFS Studies Shell Molding	July	203
Oil System, Announces	May	332
Okun, A. L., Co. Offers Cold Solder	Feb.	228
Olsen, Tinius, Testing Machine Co. Offers Extensometer	Dec.	247
Ontario Chapter of the AFS		
Foundry Course, Sponsors	Dec.	216
Service Pins, Awards 50-Year	May	263
Shell Molding, Considers	June	244
Open House, Dodge Mfg. Co. Holds	Sept.	206
Oppelm Co. Announces Metallurgical Microscope	Aug.	220
Oppelm Co. Redesigns Microscope	Nov.	264
Opportunities for Foundry Industry, Outstanding	Aug.	100
Orban, Kurt, Co. Offers Hardness Tester	Nov.	262
Orban, Kurt, Co. Offers Milling Machine	July	246
Oregon Chapter of the AFS Plans Regional Conference	July	187
Orientation of Crystals, Studies (FD)	Apr.	160
Orton Crane & Shovel Co. Offers One-Man Crane	Sept.	287
Osborn Mfg. Co.		
Belt Cleaning Unit, Announces	Jan.	236
Core Machine, Offers	May	326
Rotary Automatic Molding Machine, Develops	Oct.	238
Osbrink, R. H., Mfg. Co. Casts Magnesium Brake	June	172
Osbrink, R. H., Mfg. Co. Develops Casting Film	July	170
Otis Elevator Co. Reaches 100th Year	Nov.	271
Ottawa Silica Co. Acquires Delivery Monoplane	Nov.	168
Oven, Announces Car Type Mold	Sept.	272
Oven, Offers Batch	Apr.	227
Oxide Film, Studies Growth of (FD)	May	200
Oxy-Catalyst Inc. Offers Truck Muffler	June	268
Oxygen Results in Formation of White Iron (FD)	June	172

P

	Issue	Page
Pacific Car & Foundry Co. Hires Disabled Persons	Dec.	205
Pacific Transducer Corp. Offers Hardness Tester	Jan.	252
Packard, E. B., Co. Offers Wood Fasteners	Feb.	234
Paint		
Antirust, Announces	May	322
Fire-Retardant, Announces	Dec.	235
Waterproofing, Announces	July	256
Painting Machine, Announces	May	338
Pallet, Offers Steel and Hardwood	Sept.	295
Pallet, Offers Tubular Steel	Jan.	241
Palmer-Shile Co.		
Dump Box, Announces Automatic	May	338
Load Grab, Announces	July	255
Shovel Truck, Offers	Mar.	355
Truck Rack, Announces	Jan.	242
Pangborn Corp.		
Airless Blast Cleaner, Offers	July	246
Barrel Cleaner, Announces	June	256
Blast Cleaning Booklet, Issues	Nov.	252
Dust Collector, Announces	Dec.	232
Pantex Mfg. Co. Offers Wobble-Reed Valve	Dec.	243
Paper Wiper, Announces	Dec.	230
Paris Is Host to International Foundry Congress	Sept.	118
Parker Sweeper Co. Offers Sweeper Brush	Nov.	261
Patching Compound, Offers Mudding and	Nov.	254
Pattern, Construction of Large and Complicated	Sept.	132
Pattern Boards, Machine Mounting Devices for	Jan.	146
Pattern Draw Accuracy, Device Assures	Feb.	144
Pattern Loss, Protection Against	Feb.	152
Pattern Shop, Aircraft Builder Operates	Feb.	190
Pattern Storage, Index Card System for (Q & A)	Apr.	116
Patternmaking Industry, Apprenticeship in	Oct.	210
Patternmaking, Large Wood	Nov.	104
Patterns		
Increase Production of Flush-Tank Castings (Q & A)	Feb.	114
Offer Advantages in Investment Casting, Plastic	Sept.	120
Their Relation to Castings Production (ABC) Part III	Jan. 191; Feb. 195; Mar. 293; Apr. 217; May	243
Use of Plastic for (Q & A)	Feb.	118
Pearlitic Malleable Castings	July	84
Pekay Machine & Engineering Co. Expands Facilities	Aug.	237
Pelton Water Wheel Co. Receives Giant Casting	May	208
Penco Engineering Co. Announces Ramp	May	334
Penetration		
Cores Are Subject to (Q & A)	July	116
In Center Cores, Discovers (Q & A)	Aug.	120
Of Molten Metals into Sand, Studies (FD)	Dec.	167
Of Sand by Steel (FD)	Apr.	160
Pennsylvania Glass Sand Corp. Offers Shell Molding Sand	May	331
Pennsylvania Optical Co. Offers Safety Goggles	Apr.	229
Pennsylvania Railroad Erects War Memorial	Jan.	176
Pennsylvania Salt Mfg. Co. Offers Metal Cleaner	Mar.	346
Peterson Foundry Supply Co. Offers Refractory Gun	Mar.	348
Philadelphia Bronze & Brass Corp. Makes Welding Yoke	Oct.	262
Philadelphia Chapter of the AFS		
Acid vs Basic Cupola Linings, Considers	May	266
Casting Quality, Considers	Feb.	200
Melting Practice, Considers	Dec.	210
Nonferrous Castings, Considers	Mar.	271
Round-table Educational Courses, Conducts	Apr.	186
Sand Control, Studies	Aug.	186
Sand Program, Plans	Nov.	224
Photometer, Offers X-ray	Aug.	222
Photography, Aids High-Speed Industrial (FD)	Sept.	192
Picker X-ray Corp. Develops Quick Finish Machine	June	256
Pig Iron Production and Consumption: Jan. 130; Feb. 130; Mar. 228; Apr. 134; May 188; June 196; July 176; Aug. 144; Sept. 160; Oct. 162; Nov. 152; Dec. 160		
Pine State Foundrymen's Association Elects Officers	June	222
Pine State Foundrymen's Association Has Xmas Party	Feb.	210
Pinholing and Boiling, Studies (FD)	May	200
Pins, Casts Aluminum Bronze	Oct	208
Pipe, Centrifugal Casting of Iron	Jan.	98
Pipe Fittings in Coal Tar Pitch, Dip (Q & A)	Sept.	138
Pipe Insulation, Announces	Sept.	260
Pipe, Seeks Sand for Casting (Q & A)	July	113
Pipe Fittings, Annealing Malleable Iron (Q & A)	Jan.	114
Pitman Mfg. Co. Offers Truck Crane	Dec.	244
Pittsburgh Coke & Chemical Co.'s New Blast Furnace	Feb.	136
Pittsburgh Foundrymen's Association		
Officers, Announces	Nov.	222
Sand Control, Studies	July	188
Welding Procedures, Studies	Dec.	206
Plant Maintenance Show and Conference, Holds	Mar.	280
Plant Visitation Schedule, Chicago AFS Convention	May	302
Plaster Cores Formed in Plastic Corebox	Feb.	132
Plaster Molding, Release Agents in (Q & A)	July	112
Plaster, To Compound Metal Casting (Q & A)	Dec.	130
Plastic Patterns for Investment Casting	Sept.	120
Plastics for Patterns, Use of (Q & A)	Feb.	118
Plates, Announces Surface	Feb.	241
Plows, "Bill" Discusses Mold Boards for	Aug.	208
Plymouth Foundry Inc. Wins Safety Awards	July	224
Pneumatic Tube System Expedites Deliveries (FD)	July	160
Polyplastex International Inc. Offers Resin	Jan.	237
Porosity		
In a Grooved Sheave (Q & A)	Feb.	116
In Aluminum Castings, To Eliminate (Q & A)	Dec.	132
In Gray Iron Casting Drag Section (Q & A)	Nov.	130
In Silicone Aluminum Castings	Feb.	112
In White Cast Iron	June	128
Positioner, Announces Portable	Dec.	240
Pot, Announces Pressed Steel	Oct.	270
Potentiometer, Announces Electronic	Nov.	260
Pouring Time for Castings	Aug.	205
Powder Lance, Announces	Oct.	277
Power Crane and Shovel Association Offers Bulletin	Apr.	148
Power Plug, Offers	Sept.	289
Power Unit, Announces	July	259
Precision Casting Process	Jan.	86
Precision Investment Casting Society, Forms	Feb.	33
Precision Investment Foundry, New	Jan.	86
Press, Announces Impact	Dec.	229
Pressure-Die Casting Lubricant, Studies (FD)	July	160
Pressure Pipe Foundry Serves West Coast Area	Jan.	98
Price, A. & G., Ltd., History of	July	226
Price Cutting Should Be Realistic (Ed)	Aug.	85
Prices—Foundry Metals and Coke:	Jan.-Dec.	84
Prime-Mover Co. Announces Snow Plow	Jan.	252
Prime-Mover Co. Develops Snow Plow Blade	Dec.	250
Primer, Offers Red Lead Metal	Sept.	287

	Issue	Page
Production Pattern & Foundry Co., Shell Molding at	June	108
Progress, Ford Foundry Is Contribution to (Ed)	Mar.	137
Progress in Castings	May	116
Progressive Pattern Works Inc., Organizes	Aug.	199
Propeller, Casts Alloy Ship	Sept.	268
Pulley, To Make Large Governor (Q & A)	Aug.	116
Pulmosan Safety Equipment Corp, Announces Goggle	Apr.	231
Punch Die Tip Gray Iron Castings, Risers for (Q & A)	Mar.	200
Purchasing Agents and Salesmen Rate Each Other	Sept.	180
Purdue University		
Metals Casting Conference, Holds 1952	Jan.	253
Metals Casting Conference, Holds 1953	Dec.	190
Metals Casting Conference, Plans 1953	Oct.	232
Quality Control Course, Offers	June	212
Summer Courses Include Foundry Tours	Mar.	214
Pushbutton Foundry, Automatic Molding in	Dec.	154
Putty Paste, Develops Silicone (FD)	May	200
Pyrometer, Offers Pocket	Nov.	264

Q

Quad City Chapter of the AFS Considers Shell Molding	May	274
Quad City Chapter of the AFS Studies Nodular Iron	Jan.	223
Quaker Rubber Corp, Offers Utility Hose	Dec.	246
Quality Control in the Mechanized Jobbing Foundry	Oct.	110
Quality Control, Statistical	Dec.	120
Quality in Castings, Customers Are Entitled to (Ed)	July	83
Quality Supervision in the Small Jobbing Foundry	Feb.	97
Questions—Answers: ....Jan. 114; Feb. 114; Mar. 198; Apr. 116; May 162; June 134; July 112; Aug. 116; Sept. 136; Oct. 132; Nov. 128; Dec. 130		

R

R & J Foundry Co. Offers Bottom Boards	Dec.	247
Rack, Announces Skid	June	270
Rack Engineering Co. Offers Stock Carrier	Aug.	221
Rack, Offers Truck and Drain	Jan.	242
Radioactiivity Container, Offers	Mar.	338
Rajon Co. Makes Boxcar Unloader	Mar.	339
Ram Head Casting, Shrinkage Causes Trouble in (Q & A)	Nov.	132
Ramp, Announces Car Loading	May	334
Ramp, Announces Magnesium Loading	Oct.	274
Rampe Mfg. Co. Offers Tumbling Machine	Feb.	237
Ransohoff, N., Inc. Moves to Hamilton, O.	Aug.	171
Readers' Comment:		
Ain't No Such Animal	Feb.	78
Apprentices, How to Train	Sept.	96
Articles Useful to Student	May	112
August Editorial Should Be Required Reading	Nov.	96
Blast Frae the Nor-r-rth	Mar.	132
Bookbinder Objects, A	Nov.	96
Booster for Turkey, A	Feb.	78
Careful Selection Is the Key	Nov.	94
Christmas Touch, Likes the	Feb.	82
Coremaking Machine, New	Mar.	134
December Cover Appealing	Jan.	82
Editorial Hits the Spot	Oct.	100
Ford's Cleveland Foundry	May	112
Gating Method, Disagrees with	Aug.	78
Gray Iron Anniversary, The	Nov.	94
Hard Way, Doing It the	Sept.	96
Hurts Appeal to Young Men	Nov.	94
In Agreement on the Turks	Oct.	98
Industry Help Appreciated	June	96
It's Not "Grey" Iron	Feb.	78
June Front Cover, Praises	Aug.	80
Keeps the Riser Hot	Mar.	132
Labor Supply Problem Neglected	July	80
Malleable Conference, The	Feb.	78
Many Favorable Comments	June	96
More About the Cup, Etc.	Nov.	94
Nickel-Aluminum Bronzes, The	Oct.	98
Nonferrous Foundry Practice	Dec.	98
Our First Issue	Jan.	82
Passing around the Credit	July	80
Poor Examples of Safety	Dec.	98
Postal Trouble in South Africa	June	98
Practical Articles, Wants More	Aug.	78
Principles of Risering	May	112
Proceed with Caution	Sept.	96
Purdue's New Foundry	Jan.	82
Ralph Lee Rings the Bell	June	96
Risering, Principles of	Mar.	134
Scared of Big Bad Cupola	July	80
Science Fiction, Wants Less	Dec.	96
Sees Changes in the Industry	May	112
Shell Molding Article	Mar.	132
Spur to Capital Improvement	Dec.	96
Strainer Core Data	Jan.	82
Thanks from a Student	Feb.	82
There Is Such an Animal!	Mar.	132
This Is the Foundry Industry	May	112
Training Engineers from Abroad	June	96
Turkish Foundrymen, Helping	Aug.	80
Useful in the Classroom	Jan.	82
Wants Tearsheets	Apr.	82
Why Not Stockpile Castings?	Apr.	82
Winch Drum, How To Mold a	Aug.	78
Reading Foundrymen's Association		
Core Blowing in Jobbing Foundries, Studies	May	272
Foundry Industry Developments, Reviews	Aug.	182
Material Handling, Studies	Jan.	216
Metals Conference, Holds	Mar.	272
Ready-Power Co. Announces Power Unit	July	259
Red Cross Fund 1953	Feb.	249
Reed Roller Bit Co. Holds Air Tool Training	July	184
Reeves Pulley Co. Announces Speed Drive	July	258
Reeves Pulley Co. Offers Speed Drive	Mar.	347
Reflector, Announces Lamp	May	343
Refractory Gun, Announces	Mar.	348
Regional Foundry Conference		
California AFS Chapters Hold	Apr.	167
Canadian AFS Chapters Hold	Jan.	132
Michigan AFS Chapters Hold	Dec.	162
New England Foundrymen Hold	Dec.	220
Niagara Frontier Chapters Hold AFS	Nov.	207
Northern California Chapter Holds	Feb.	210
Ohio AFS Chapters Hold 6th	Nov.	272
Southeast Chapters Hold 21st AFS	Apr.	151
Southwest Chapters Hold Third AFS	Jan.	261
Wisconsin AFS Chapter Holds	Apr.	196
Reichhold Chemicals Inc. Demonstrates Shell Molding	Oct.	164
Reintjes, Geo. P., Co. Develops Furnace Checker	May	328
Relay, Announces Standardized	June	269
Release Agents in Plaster Molding (Q & A)	July	112
Reliance Electric & Engineering Co. Offers Speed Drive	June	262
Renton, R. W., & Co. Offers Blasting Machine	May	314
Repair Plug, Offers Casting	Apr.	223
Republic Rubber Division Offers Industrial Hose	Jan.	241
Research Corp. Offers Pulse Generator	Feb.	234
Resin		
As Core Binder, Uses Polyester (FD)	Nov.	170
For Sand Core Bonding, Announces Liquid	Feb.	240
For Sealing and Impregnating Castings, Offers	Jan.	237
To Eliminate Clay Balls, Announces	Apr.	224
Resin Molding Compound, Uses Glass Reinforced (FD)	Dec.	167
Respirator, Announces	Sept.	274
Reuland Electric Co.		
Motor Reducer, Announces	May	343
Motor Reducer, Offers	Oct.	272
Variable Speed Motor, Develops	Feb.	234
Rice Hulls, Discusses Aplication of (FD)	Mar.	230
Riser Opening, Paper Covers (Q & A)	Feb.	114
Risering, Principles of	Feb.	100
Risers		
For Clean Castings, Blind (Q & A)	June	136
On Die Tips, Knockoff (Q & A)	Mar.	200
To Eliminate Coarse Structure under (Q & A)	July	112
Riverside Foundry, Core Baking System at	Dec.	184
Riverside Foundry, Sand Handling System at	Aug.	202
Robinson, Frank L., Co. Offers Pallet Roller	Nov.	260
Rochester Chapter of the AFS		
Core Problems, Considers	May	287
Foundry Equipment and Dust Control, Studies	Jan.	218
Foundry Industry in Turkey, Studies	Feb.	204
Foundry Progress, Reviews	June	234
Mechanization in Small Foundries, Studies	Dec.	215
Nonferrous Metals, Considers	Mar.	251
Patternmaking, Considers Patterns and	Apr.	172
Picnic, Holds Barbeque	Nov.	230
Rock-Tred Corp. Offers Floor Resurfacer	June	264
Rockwell Mfg. Co. Holds School Shop Planning Contest	Oct.	188
Rodale Mfg. Co. Offers Connector	June	261
Roesch, C. A., & Co. Announces Cleaning Gun	Nov.	255
Roll Foundry, Completes British	Feb.	108
Rolle Mfg. Co., Casting Light Alloys at	June	114
Roller, Offers Pallet	Nov.	260
Rolls, To Make Hollow Cast Iron (Q & A)	Dec.	132
Roof Exhauster, Offers	Aug.	225
Roots-Connersville Blower Corp. Offers Compressors	Jan.	242
Rope, Announces Wire	July	254
Rope, Offers Wire	Feb.	230
Ross, J. O., Engineering Corp. Honors Employees	May	256
Roura Iron Works Makes Self-Dumping Hopper	Nov.	260
Royal Oak Tool & Machine Co. Offers Wheel Dresser	June	268
Royal Foundry & Machine Co. Offers Sand Cleaner	Dec.	230
Ryerson, Joseph T., & Son Offers Gagger Bar	Oct.	274
Ryke's Technical Trading Co. Offers Centrifugal Casting Machine	Sept.	272

S

S-P Mfg. Corp. Offers Hydraulic Cylinder	May	338
Safety and Air Pollution Conference, Holds	Apr.	190
Safety Booklet, Issues Plant	Apr.	34
Safety Congress, Plans National	Oct.	252
Safety in Jobbing Shop Operations	June	113
Safety Shoe for Extension Ladder, Offers	Nov.	256
Safeway Industrial Equipment Corp. Offers Truck	Sept.	279
Sage Equipment Co.		
Conveyor, Announces Heavy-duty Roller	Apr.	232
Conveyor for Hot Castings, Offers Slat	May	335
Turntable for Conveyor, Offers	Sept.	296
Saginaw Valley Chapter of the AFS		
Cast Iron Metallurgy, Studies	June	238
Cupola Fuels, Considers	Mar.	260
Officers, Elects	July	203
Shell Molding, Studies	Dec.	218
Shell Molding Techniques, Studies	Feb.	200
St. Louis District Chapter of the AFS		
Apprentice Training Certificates, Presents	May	268
Better Foundries, Studies Guide Posts for	Dec.	216
Core Blowing, Considers	July	190
Shell Molding Symposium, Holds	Nov.	230
Salesmen and Purchasing Agents Rate Each Other	Sept.	180
Sall, George, Metals Co. Builds Plant	July	224
Sand		
British Investigator Correlates Testing of (FD)	Aug.	140
Casting Section Thickness Determines Grade of	Feb.	118
Chilling Power of High Density (FD)	Mar.	230
Dried and Graded, Offers	July	247
Experimental Work with Resin Bonded (FD)	Dec.	167
Fineness Indicates Grain Distribution in (Q & A)	July	113
For Brass and Bronze Castings, Use Coarse (FD)	Feb.	146
For Bronze Casting Molds, Use Refractory (Q & A)	Mar.	198
For Casting Pipe, Seeks Suitable (Q & A)	July	113
For Shell Molds, Uses Precoated Resin-Bonded (FD)	Jan.	142
Grain Fineness, To Find (Q & A)	Mar.	198
Has Trouble in Ramming (Q & A)	Oct.	134
In Their Shoes (Chapter 1)	Sept.	126
Moisture's Effect on Dust Produced by (FD)	Feb.	146
Must Be Dry, Sandblast (Q & A)	Oct.	132
Shell Molding, Announces	May	331
Silos Offer Advantages in Storing Core	Mar.	192
Steel Penetrates Molding (FD)	Apr.	160
Studies Penetration of Molten Metals into (FD)	Dec.	167
Technique of Making Molds with French (Q & A)	Sept.	140

	Issue	Page
Sand Association Effects Reduction in Freight Rates	July	244
Sand Blaster, Announces	June	263
Sand Cleaning Unit, Offers	Dec.	230
Sand Conditioner, Offers	Aug.	215
Sand Controller, Announces	May	340
Sand Cores for Hollow Castings Use (Q & A)	Oct.	136
Sand Distribution Unit, Develops	Dec.	240
Sand Drying Machine, Announces	June	256
Sand Handling System, Installs Modern	Aug.	202
Sand Moisture, Automatic Control of	Nov.	120
Sand-Oil Scale Forms on Aluminum Coreboxes (Q & A)	Mar.	200
Sand Reclamation Unit, Offers	July	247
Sander, Announces Belt	June	266
Saw		
Abrasive Cutoff, Designs	Aug.	216
Adjustable, Announces	May	322
Band, Offers Special	Sept.	280
Horizontal Band, Designs	June	263
Large Capacity, Offers	Feb.	242
Radial Arm, Announces	June	261
Scale		
For Pouroff of Liquids, Offers Batching	May	314
Hoist or Crane, Designs	Oct.	267
Industrial, Announces	Dec.	240
Overhead Suspension, Announces	Apr.	229
Platform, Offers	Mar.	354
Scarfing Equipment, Offers	Sept.	280
Scherr, George, Co. Announces Caliper	Sept.	284
Schmeig Industries Inc, Offers Dust Eliminator	Nov.	264
Scoop		
End Loading, Develops	Oct.	276
Fork Truck, Announces	Dec.	242
Fork Truck, Offers	Nov.	266
Scott Paper Co. Offers Paper Wiper	Dec.	230
Scrap, "Bill" Discusses Melting Heavy	Apr.	206
Scrap Loss Figures Vary (Q & A)	Feb.	114
Scrap Should not Be Exported, Ferrous (Ed)	Dec.	101
Screen, Offers High-Speed Vibrating	Aug.	215
Screen Shields Operator from Melting Heat	Dec.	156
Seagrave Corp. Employs Tramrail Cranes	Feb.	176
Sealant, Offers Casting	Oct.	281
Seaman Medal, Confers AFS	Jan.	194
Segregation in White Cast Iron	June	128
Sentry Co. Announces Electric Furnace	June	265
Shakeout, Announces Medium Duty	July	251
Shakeout, Improves Design of	Aug.	214
Shaking Out Steel Castings	Feb. 92; Mar. 194; Apr. 96; May	218
Shalco Engineering Corp. Offers Shell Molding Unit	Nov.	254
Shaler Co. Announces Machinery Cleaner	Feb.	243
Shallway Corp. Develops Shell Molding Machine	Oct.	164
Sheave, Porosity in a Grooved (Q & A)	Feb.	116
Shell Cores for Air-Cooled Engines	Dec.	114
Shell Mold Halves, Stapler Fastens (FD)	Mar.	230
Shell Mold Release Agent, Offers	July	247
Shell Mold Seminar, Foundrymen Hold	Nov.	180
Shell Molding Equipment, Announces	July	252
Shell Molding Foundry, Laying Out a	June	108
Shell Molding Machine and Oven, Offers	Nov.	254
Shell Molding Machine, Offers	Mar.	338
Shell Molding Materials, Offers	Apr.	222
Shell Molding Process		
British Foundry Improves (FD)	Nov.	170
Cost of	Oct.	156
Develops Dietert	July	169
Magnesium Castings Produced by	Mar.	336
Manganese Steel Castings To Be Made with (Q & A)	June	134
Pattern Temperatures in (FD)	Feb.	146
Precoated Resin-Bonded Sand in, Uses (FD)	Jan.	142
To Nodular Iron Castings, Applies (FD)	May	200
Shell Molds		
Back-up Material for	Nov.	178
Blows Resin Bonded Sand into Driers To Form (FD)	Dec.	167
Mechanical Clamp for (FD)	Sept	192
Shell Oil Co. Offers Multipurpose Grease	Feb.	243
Shell Process Inc. Offers Shell Molding Machine	Mar.	338
Shellmold & Machine Co. Machines, SPO Inc. To Make	Jan.	233
Shells for Ammunition	July	88
Shelter, Offers Canvas Loading Dock	Jan.	243
Shepard Niles Crane & Hoist Corp. Reaches 50th Year	Feb.	151
Shoe Toe Clips, Announces	Sept.	282
Shrink Bob Gating for Clean Castings (Q & A)	June	136
Shrinkage		
Alloy Castings Show Center-Line (Q & A)	Apr.	120
Cracks in Alloy Castings Caused by (Q & A)	June	134
In Ram Head Casting Causes Trouble (Q & A)	Nov.	132
Side Bar Castings for Stationary Grates Warp (Q & A)	Sept.	137
Silicates, Reports Thermo-Dynamic Properties of (FD)	June	172
Silicon Aluminum Castings, Surface Porosity in	Feb.	112
Singer Glove Mfg. Co. Offers Protective Mitt	Nov.	254
Sketching Kit, Announces	Dec.	246
Slag		
Above Tap Hole, Keeps (FD)	Aug.	140
Color of, Discusses (Q & A)	Oct.	136
Foams in Cupola (Q & A)	Jan.	116
Trouble Caused by Foaming of (Q & A)	July	112
Slag Disposal Unit, Offers	Mar.	346
Slag-Hole Block, Announces	Sept.	273
Sling, Offers Wire Rope	June	256
Slugs, To Cast Gray Iron (Q & A)	Dec.	134
Small Foundries Predominate	Oct.	194
Smith, James Campbell, Co. Offers Positioner	Dec.	240
Smith Power Transmission Co. Offers Grinder	Jan.	244
Snagging Operations	Jan.	112
Snowplow Attachment		
For Fork Truck, Offers Adjustable	Dec.	230
For Power Wheelbarrow, Announces	Jan.	252
Nonhydraulic, Develops Detachable	Feb.	233
Society of Automotive Engineers		
Cleveland Meeting, Holds	May	348
Cleveland Meeting, Plans	Mar.	298
New York Meeting, Holds	Apr.	144
Production Forum in Toronto, Holds	Dec.	176
Sodium Carbonate Additions to Refractory Sand Mix (Q & A)	Nov.	130
Softening Improves Gray Iron Machinability (I)	Dec.	108
Soil Pipe Casting Defect Is Cold Shut (Q & A)	June	138
Solar Aircraft Co. Offers Welding Flux	Sept.	286
Solder, Announces Plastic Metal Base	Sept.	282
Solder, Offers Cold	Feb.	228
Soldering Equipment, Makes Ultrasonic (FD)	Jan.	142
Solidification of Bronze, Temperature Affects	Dec.	107
Solidification of Castings, Vibration Effects	July	101
Southeastern Regional Foundry Conference, Holds AFS	Apr.	151
Southeastern Regional Foundry Conference, Plans	Feb.	134
Southern California Chapter of the AFS		
Castings and Weldments, Studies	May	281
Christmas Party, Holds	Feb.	207
Mechanization in Molding, Studies	Mar.	248
Officers, Elects	Aug.	185
Outing, Holds Annual	Oct.	227
Profits and Personnel Relations, Studies	Apr.	182
Safety and Hygiene, Studies	Nov.	226
Sand School, Plans	Sept.	240
Shell Molding, Considers	Jan.	220
Southwest Regional Conference, Holds AFS	Jan.	261
Special Chemicals Corp. Offers Blacking Compound	Feb.	238
Specifications (Standard) Data Sheet:		
Bronze Bridge and Turntable Castings	Jan.	155
Bronze Castings for Locomotive Wearing Parts	Feb.	183
Leaded Nickel Brass and Bronze Sand Castings	Mar.	219
Speco Inc. Announces Antirust Paint	May	322
Spectacles, Announces Lightweight	Sept.	295
Spectacles, Offers Magnifying	Jan.	236
Spectrograph, Announces Stigmatic Grating	Dec.	231
Spectrographers Plan Symposium	Mar.	278
Spectrometer, Offers Portable	Mar.	350
Speed Drive		
For Industrial Applications, Offers	July	258
Fractional Horsepower Variable, Announces	Mar.	347
Variable, Offers	June	262
With Dual Cooling System Offers	Mar.	339
Speer Carbon Co.		
Hydraulic Truck Unloader, Uses	Apr.	170
Rotary Calciner, Installs	Jan.	152
Safety Awards, Gives Employee	Nov.	168
Sperry Products Inc, Seeks Foreign Markets	Nov.	210
Spherulite Formation and Growth, Graphite	Nov.	100
Spic and Span Foundry Quadruples Tonnage	Jan.	136
SPO INC.		
Automatic Cycle Molding Machine, Develops (FD)	Jan.	142
Molding Unit, Develops Continuous	Apr.	222
Shellmold Co. Machines, To Manufacture	Jan.	233
Spot-Testers Inc. Offers Metal Testing Kit	Nov.	254
Spot Testing Distinguishes Bronze Type (Q & A)	Nov.	132
Sprinkler Head Castings, Cracks Develop in (Q & A)	June	134
Sprocket, Announces Roller Chain Drive	Apr.	224
Sprocket, Develops	May	325
Sprocket Wheel, Chills Harden Surface of (Q & A)	Aug.	120
Sprocket Wheel, Wants Gating System for (Q & A)	Jan.	115
Stabilizer, Announces Electrode	Apr.	236
Stackpole Carbon Co. Offers Spectrographite Rod	Aug.	221
Standard Brass Works Honors 25-Year Men	June	198
Standard Conveyor Co. Offers Pneumatic Tube System (FD)	July	160
Standard Electric Mfg. Co. Offers Blower	Jan.	241
Standard Electric Mfg. Co. Offers Mixer	Mar.	353
Standard Safety Equipment Co. Offers Shoe Clips	Sept.	282
Stanford Research Institute Reprints Atomic Report	Dec.	249
Stapler Fastens Shell Mold Halves (FD)	Mar.	230
States Engineering Corp. Offers Sand Conditioner	Aug.	215
Statistical Quality Control	Dec.	120
Statistical Quality Control Data, Offers	Dec.	33
Steel Armor, Cleaning Cast	Aug.	178
Steel Castings		
Cracks and Hot Tears in	June	120
Heat Treatment of	Oct. 122; Nov. 124; Dec.	126
Mold Design for	Oct.	242
Procedure for Cleaning (Q & A)	June	138
Shaking Out-Cleaning-Welding	Feb. 92; Mar. 194; Apr. 96; May	218
Technical Advances in	May	130
Steel Founders' Society of America		
Annual Meeting, Holds 51st	May	253
Castings Booklet, Prepares	June	191
Fall Meeting, Holds Annual	Nov.	186
Foundry Directory, Issues	July	242
Foundry Executives, Honors	June	230
Officers, Elects	Feb.	33
Product Development Contest, Announces	Dec.	205
Steel Castings Handbook, Issues Second	Mar.	278
Technical and Operating Conference, Holds	Jan.	162
Steel Foundry Industry, "Bill" Discusses	Dec.	196
Steel Foundry Plants "Down Under"	July	226
Steel Jobbing Foundry, The "Ideal" (Part II)	Jan.	102
Steel Penetrates Molding Sand (FD)	Apr.	160
Steel Piping Specifications, Issues	Sept.	270
Steel, To Reduce High Carbon in Stainless (Q & A)	Jan.	114
Stephens-Adamson Mfg. Co. Offers Boxcar Unloader	June	269
Sterling-Electric Motors Inc. Offers Speed Drive	Mar.	339
Stevens Institute of Technology Studies Oxide Film (FD)	May	200
Stock Carrier, Offers	Aug.	221
Stewart-Warner Corp. Offers Conveyor Lubricator	Apr.	227
Stokes Machine Co. Develops Molding Press	Oct.	220
Stone Machinery Co. Offers Cutoff Machine	Aug.	224
Stopper Rod Bolt Is Melted (Q & A)	Dec.	130
Storage Building, Offers	Oct.	276
Stoveplate Castings, Composition for (Q & A)	June	135
Stoveplate Castings Crack and Warp (Q & A)	Dec.	132
Strainer Core Consumption, Studies	May	305
Stress Relief of Gray Iron	Aug. 112; Sept.	128
Sub-Zero Products Co. Offers Chilling Machine	July	255
Sugar Beet Products Co. Offers Wash Station	Mar.	351
Sulphation in Electric Storage Batteries, Explains (FD)	Oct.	171
Sulphur Removal in Acid-Melted Gray Iron (FD)	Mar.	230
Superior Separator Co. Offers Air Centrifuge	Sept.	290
Superior Tube Co. Provides Cooling Element	Oct.	262
Surfacing Process, Offers Metal	Oct.	266
Sutter Products Co. Offers Core Blower	Feb.	228
Sweeper, Announces Industrial Power	Dec.	238
Sweeper, Announces Magnetic	July	252
Sweeper Attachment, Offers	Oct.	282

	Issue	Page
Swiss Foundry Issues Anniversary Publications	Nov.	188
Swiss Foundry Marks Sesquicentennial	Jan.	211
Swiss Foundry Progress	Sept.	116
Switch, Offers Safety Switch	Jan.	237
Symington-Gould Corp., High-Speed Molding at	Apr.	98
Syntron Co. Announces Vibratory Feeder	July	251
Syntron Co. Offers Vibratory Feeder	Mar.	350

T

Tablets and Plaques, Stamping Back (Q & A)	May	166
Taccone Pneumatic Foundry Equipment Corp. Offers Squeezer Machine	Feb.	229
Tank Treads in Shell Molds, Making (Q & A)	June	134
Tape, Develops Filament	Nov.	266
Technical Operations Inc. Offers Radiography Course	Sept.	242
Tempil Corp. Announces Temperature Indicator	Nov.	254
Template, Announces Profile	May	315
Tennant, C., Sons & Co. Offers Hardness Tester	Mar.	352
Tennant, G. H., Co. Develops Power Sweeper	Dec.	238
Tennessee Chapter of the AFS		
Cupola Chemical Changes, Studies	Apr.	178
Fool-Proof Sand, Discusses	Dec.	215
Gating Design, Considers	July	197
Outing, Holds Annual	Nov.	222
Southeastern Foundry Conference, Plans	Feb.	134
Tensile Strength of Gray Iron, To Increase (Q & A)	Apr.	117
Tester, Announces Voltage	Sept.	292
Tester, Offers Hardness	Jan.	252
Testing Machines, Develops Huge (FD)	Sept.	192
Testing of Castings, Ultrasonic	Sept.	221
Texas Chapter of the AFS		
Essentials of Good Castings, Considers	May	287
Officers, Elects	Aug.	182
San Antonio Section Considers X-ray Inspection	Dec.	208
Texas A & M College Student Chapter, Meets	Mar.	254
Texas Electric Steel Castings Co. Boosts Charity Fund	Nov.	192
Textile Machine Works, Use of Compressed Air at	Sept.	212
Thefts, Chicago Founders Act on Metal..Apr. 148; June 188; Aug.		154
Thefts, Dogs To Prevent British Metal (FD)	July	160
Thermal Conductivity, Reports on (FD)	Oct.	171
Thermo Electric Co. Offers Pyrometer Controller	May	326
Thermocouple, Designing an Immersion	Aug.	193
Thermocouple Head, Announces	Sept.	296
Thermo-Dynamic Properties of Silicates, Reports (FD)	June	172
Thermometer, Offers Foundry	Jan.	248
Thew Shovel Co. Offers Motorized Crane	Mar.	346
Thew Shovel Co. Offers Truck Crane	Feb.	239
Thomas & Betts Co. Offers Conduit Fitting	Sept.	286
Thor Power Tool Co. Offers Scaling Hammer	July	252
Timken Roller Bearing Co. Uses Magnet-Equipped Truck	Sept.	198
Tin		
And Leaded-Tin Bronzes	July	94
In Aluminum-Tin Alloys, Increase (FD)	Aug.	140
In Copper-Base Alloys	Aug.	115
Tincher Products Co. Offers Casting Sealant	Oct.	281
Toledo Chapter of the AFS Announces Officers	Apr.	174
Toledo Scale Co. Offers Industrial Scales	Dec.	240
Tool, Announces Power Impact	May	321
Tool, Offers Portable Electric Hand	Mar.	348
Toolcraft Mfg. Co. Offers Template	May	315
Torch, Develops Flame Washing	Mar.	354
Torque Drive, Develops	Oct.	271
Torsion Test Device, Offers	Oct.	267
Tour, Sam, & Co. Aids High-Speed Photography (FD)	Sept.	192
Tour, Sam, & Co. Demonstrates Routine Analysis (FD)	May	200
Towmotor Corp.		
Coupler, Announces	May	342
Diesel Fork Truck, Announces	Dec.	246
Engine Hour Meter, Announces	Sept.	289
Lift Truck Differential, Offers	June	267
Pneumatic-Tired Lift Truck, Offers	July	257
Torque Drive, Develops	Oct.	271
Trabon Engineering Corp. Offers Oil System	May	332
Tracerlab Inc.		
Cobalt-60 Training Course, Offers	Feb.	199
Iridium Sources, Announces	Aug.	223
Radioactivity Container, Announces	Mar.	338
Tractor		
Battery-Powered, Announces	Feb.	241
Crawler, Develops	Apr.	230
Hydraulic-Mechanized, Offers	July	252
Tractor Shoe, Composition for (Q & A)	Jan.	118
Tractor Shovel, Offers	June	264
Trade Publications: Jan. 274; Feb. 264; Mar. 357; Apr. 257; May 353; June 298; July 270; Aug. 250; Sept. 311; Oct. 286; Nov. 292; Dec. 268		
Trailer, Announces Heavy-Duty	July	246
Training Program Pays Off, Accelerated	Oct.	148
Transall Inc. Offers Belt Conveyor Idler	Oct.	275
Transmitter, Announces Pneumatic	Apr.	234
Tri-State Chapter of the AFS Holds Xmas Party	Feb.	212
Trolley System, Offers Safety	May	325
Trouble-Shooting Die Casting Problems	Feb. 86; Mar.	196
Truck		
Diesel Fork, Announces	Dec.	246
Electric Battery-Powered Pallet, Offers	Jan.	251
Electric Stand-up Fork, Designs	Mar.	340
Fast Pick-up Shovel, Announces	Mar.	355
Furnace Charger, Announces	Jan.	248
Gas-Powered Industrial, Offers	Aug.	214
Magnesium Hand, Announces	July	258
Maneuverable Fork Lift, Announces	Oct.	276
Pneumatic-Fired Lift, Offers	July	257
Portable Fork Lift, Announces	Sept.	279
Revolving Crane, Develops	Dec.	239
Two-Motor Lift, Announces	May	314
With Gasoline Engine, Offers Fork Lift	July	246
With Third Wheel, Offers Hand	July	253
[T]uck Mount, Offers	May	340
[T]ruck-Trailer, Announces Hand	Mar.	353
[T]rucks Facilitate Jobbing and Production Operations	Feb.	178
[T]ubing Appliance Co. Offers Ratcheting Wrench	Jan.	246
[T]ubing in Blade Center, Uses (FD)	Dec.	167
Tubular Castings Show Cracks (Q & A)	Oct.	133
Tubing, Casts Welding Machine Yoke around Nickel		
Tumbling Machine, Announces	Feb.	237
Turntable for Conveyor, Offers	Sept.	296
Turner & Haws Engineering Co. Offers Blow Ring	May	332
Twin City Chapter of the AFS		
Casting Light Metals, Considers	Apr.	184
Designs for Magnesium, Considers	Dec.	208
Golf Outing, Plans	July	194
Golf Tournament, Holds Annual	Oct.	230
High-Pressure Molding, Considers	Nov.	228
Minneapolis Electric Steel Castings Co., Visits	Feb.	215
Minnesota-Wisconsin Iron Ore Deposits, Studies	Mar.	245
Officers, Elects	June	222
Student Night, Holds	Jan.	224
Twinmatic Corp. Offers Two-Way Coupling	Oct.	278

U

U. S. Marine Corps, Bronze Memorial To Honor	Oct.	104
U. S. Pipe & Foundry Co., Pressure Pipe Foundry of	Jan.	98
U. S. Plug & Fitting Co. Offers Casting Repair	Apr.	223
U. S. Stoneware Co. Offers Fume Washing Tower	Sept.	293
Ultra-Violet Products Inc. Offers Lamp	May	341
Ultrasonic Soldering Equipment, Uses (FD)	Jan.	142
Ultrasonic Testing of Castings	Sept.	221
Union Metal Mfg. Co. Offers Scoop	Oct.	276
Union Steel Products Co. Offers Shipping Boxes	Sept.	273
United Laboratories Inc. Offers Floor Penetrant	May	341
United States and Canada Have 5938 Foundries	Sept.	134
United States Safety Service Co.		
Goggles, Develops Cup Type	Nov.	266
Safety Hat, Offers	Feb.	239
Welding Helmet, Announces	Apr.	237
Universal Standard Inc. Offers Trolley System	May	325
Universal Vibrating Screen Co. Offers Screen	Aug.	215
Universal-Rundle Corp. Makes Plumbing Fixture Film	July	212
University, Cast Metals and the	Sept.	162
University of Illinois Co-Sponsors Safety Conference	Apr.	190
University of Michigan		
Cast Metals Laboratory at the	Sept.	162
FEF Advisory Committee of the	Mar.	240
Foundry Course, Plans	May	345
University of Wisconsin Holds Foundry Conference	Apr.	196
University of Wisconsin Studies High Pressure Molding	Mar. 307; Aug.	146
Unloader, Offers Boxcar	June	269

V

V-Belt Repair Kit, Announces	Nov.	254
Vacuum Cleaner Nozzles Show Fine Porosity (Q & A)	Sept.	137
Valve		
Safety Shut-off, Announces	Dec.	235
To Mount Bronze Seat in Gate (Q & A)	Jan.	118
Wobble-Rod, Announces	Dec.	243
Van Products Co. Offers Dehumidifier	Dec.	242
Ventilating at Ford's Cleveland Foundry	Mar	184
Ventilation Conference, Plans Industrial	Jan.	260
Ventilator, Announces Automatic	July	256
Ventilator, Announces Roof	May	330
Vibration Effects during Casting Solidification	July	100
Vibrator, Announces Air	May	334
Viscosity of Aluminum and Binary Aluminum Alloys (FD)	Jan.	142
Vise and Drill Press, Offers	Sept.	293
Vise Jaws, Announces	Feb.	237
Von Jonker Corp. Offers Belt Sander	June	266

W

Wagner Malleable Iron Co. Modernizes Foundry	July	84
Wall Colmonoy Corp. Develops Hard-Facing Alloy (FD)	Nov.	170
Warping, Shakeout of Castings May Cause (Q & A)	Sept.	137
Wash Station, Offers Waterless	Mar.	351
Washington Chapter of the AFS		
Feeding Range of Risers, Studies	June	232
Regional Foundry Conference, Plans	July	187
Safety and Hygiene, Considers	Dec.	208
Watchemoket Optical Co. Offers Spectacles	Sept.	295
Webb, Jervis B., Co. Announces Conveyor Chain	Dec.	230
Weighing Unit, Announces	June	266
Weight Recorder, Announces	Sept.	289
Welding Control, Announces	Oct.	271
Welding Heads, Offers	Mar.	355
Welding Machine Yoke Is Cast around Nickel Tubing	Oct.	262
Welding Nodular Graphite Castings, Gas (FD)	Feb.	146
Welding Rod, Announces Cast Aluminum	Oct.	266
Welding Rod, Announces Oxy-Acetylene	Nov.	263
Welding Rod Casting, To Simplify (Q & A)	May	166
Welding Steel Castings	Feb. 92; Mar. 194; Apr. 96; May	218
Welding Torch, Announces	Feb.	234
Wells Mfg. Corp. Offers Band Saw	June	263
Wells Mfg. Co. Quadruples Tonnage	Jan.	136
Western Metal Congress, Plans	Feb.	217
Westinghouse Electric Corp.		
Arc Welder, Announces	Nov.	255
Heater, Announces Industrial	Mar.	347
Huge Iron Casting, Pours	July	184
Mercury Lamp, Offers	July	247
Pattern File Room at	Mar.	222
Research Center, Builds New	Aug.	233
Seven-Ton Core, Produces	July	166
X-ray Cabinet, Announces	May	326
X-ray Unit, Offers Mobile	Sept.	273
What Is a Good Pattern?	Sept.	132
Wheel, Announces Hub-Type Cutoff	Dec.	241
Wheel Block, Announces Truck	Apr.	232
Wheel Dresser, Announces	June	268
Wheel Guard, Announces	Dec.	245
Wheel Weights, Porosity and Shrinkage in (Q & A)	Aug.	118
White Cast Iron, Porosity and Segregation in	June	128
White Iron, Electric Annealing of	Nov.	112

	Issue	Page
Whiting Corp. Develops Dust Suppressor	Dec.	194
Why Not Make It Permanent? (Ed)	Feb.	85
Wiegand, Edwin L., Co. Offers Heater	May	335
Wiegand, Edwin L., Co. Offers Mold Wash Dryer	Oct.	267
Wilkinson Callon Ltd., History of	July	226
Willson Products Inc. Announces Goggles	Oct.	275
Willson Products Inc. Offers Safety Hat	June	263
Wilton Tool Mfg. Co. Offers Press and Vice	Sept.	293
Winch Drums in Cores, Make (Q & A)	Apr.	118
Winner Mfg. Co. Offers Grease Fitting Cover	Nov.	254
Wire, Would Salvage Copper (Q & A)	July	114
Wisconsin Apprentices Demonstrate Foundry Practice	Dec.	201
Wisconsin Chapter of the AFS		
Apprenticeship Contest, Announces	Apr.	176
Christmas Party, Holds	Feb.	204
Golf Outing, Holds Annual	Sept.	238
Management Night, Holds	May	284
Management Night, Holds	Dec.	212
Officers, Elects	June	224
Old Timers' Night, Holds	July	197
Regional Foundry Conference, Holds	Apr.	190
Regional Foundry Conference, Plans	Feb.	170
Sectional Meetings, Holds	Nov.	224
Technical Sessions, Holds	Jan.	220
Training for FBI Men, Considers	Mar.	242
Wisconsin Foundries Hold Exhibit	Nov.	246
Wise, Henry H., Co., Designs Cutoff Saw	Aug.	216
With the Editors	Jan.-Dec.	10
Woodhill Chemical Co. Announces Solder	Sept.	282
Work Saving Methods, Sponsors	Nov.	210
Worthington Corp. Holds Sales Conference	Sept.	268
Wrench, Announces Pipe	May	331
Wrench, Announces Ratcheting Socket	Jan.	246

X

	Issue	Page
X-ray Cabinet, Announces	May	326
X-ray Machine		
Instant Print, Develops	June	256
Mobile, Develops	Sept.	273
Portable, Announces	Jan.	250
Portable Industrial, Announces	Sept.	287
Xeroradiography Extends Use of Radiography	Dec.	147

Y

	Issue	Page
Yale & Towne Mfg. Co.		
Course for Fork Lift Truck Operators, Offers	Sept.	190
Deck Type Electric Hoist, Offers	Jan.	246
Fork Truck Scoop, Offers	Dec.	242
Gas Truck with Lifting Magnet, Announces	Nov.	259
Materials Handling Show, Plans Traveling	Apr.	144
Yard-Stor Shelter Co. Offers Storage Building	Oct.	276
Yard-Stor Shelter Co. Offers Metal Storage Units	Oct.	276

Z

	Issue	Page
Zenith Foundry Co. Wins Safety Award	Aug.	162
Zinc Fumes, Aluminum Addition Suppresses (FD)	Apr.	160
Zinc Loss in Melting Brass, Minimize (Q & A)	May	162
Zinc-Base Alloy Shipments: Jan. 130; Feb. 130; Mar. 228; Apr. May 188; June 196; July 176; Aug. 144; Sept. 160; Oct. Nov. 152; Dec. 160		134; 162;
Zircon and Its Foundry Applications	Apr.	92
Zoller Casting Co., Cupola Practice at	Sept.	124
Zonolite Co. Offers Insulating Firebrick	Jan.	238

Author Index—1953

A

	Issue	Page
Allen, Marion J.		
FEF Program Achieves Education Objective	Feb.	160
Austin, C.R.		
Coke Quality and Carbon Pickup	Oct.	116

B

	Issue	Page
Baker, Samuel W.		
Magnesium Group Meets in New York	Jan.	206
Banister, Roland S.		
Plastic Patterns offer Advantages in Investment Casting	Sept.	120
Barlow, Tom and Heine, Prof. Richard		
High Pressure Molding Studies	Aug.	146
Berger, M. J. and Rostoker, W.		
Effects of Vibration during Solidification	July	100
Bish, R. E.		
Immersion Thermocouple, Designing an	Aug.	193
Blakley, Tom		
Cartoons: Oct. 154, 241, 253; Nov. 184		
Bremer, Edwin		
ASTM Annual Meeting, Holds	Aug.	159
Aluminum Foundry Has Three Strings for Its Bow	Nov.	116
Drops Cupola Bottom Once a Week	Sept.	124
Electric Furnace Steel Conference	Feb.	186
Illinois University Conference Stresses Safety	Apr.	190
Michigan Regional Foundry Conference, Holds	Dec.	162
Niagara Frontier Conference, Holds	Nov.	207
Open Hearth Committee Holds Annual Conference	June	184
Bremer, Edwin and Miske, Jack C.		
Ohio Regional Foundry Conference Offers Varied Program	Nov.	272
Briggs, Charles W.		
Steel Castings	May	130
Brown, Floyd		
Malleablization, Mechanism of Second-Stage	Oct.	108
Brown, Henry F.		
Two-Way Ladle Transfer Hook	May	195
Brown, Hiram		
Nonferrous Foundry Practice	Aug.	108
Burgess, Charles O.		
Gray Iron Castings	May	118
Stress Relief of Gray Iron	Aug. 112; Sept.	128

C

	Issue	Page
Caine, John B.		
Cracks and Hot Tears in Steel Castings	June	120
Capps, Frank R.		
Simplifies Casting of Aluminum Bronze Pins	Oct.	208
Cech, Robert A.		
Determination of Feeding Systems	Oct.	128
Chase, Herbert		
Buick Continues Foundry Mechanization	Feb.	173
Chihoski, Russell A.		
MIT Student Chapter Is Active Group	June	232
Close, Gilbert C.		
Plaster Cores Formed in Plastic Corebox	Feb.	132
Coleman, Walter W.		
Shell Molding: What Does It Cost?	Oct.	156
Croft, Arthur C.		
Foremen's Problems and How To Solve Them	Dec.	118
Curry, Thomas W.		
Quality Control in the Mechanized Jobbing Foundry	Oct.	110

D

	Issue	Page
Danch, Bill		
Cartoons:	Oct.	192
De Sy, Albert		
Graphite Spherulite Formation and Growth	Nov.	100
Degley, Maurice F.		
Silos Provide Advantages in Storing Core Sand	Mar.	192
Delport, Vincent		
Institute of British Foundrymen Annual Meeting	Aug.	176
International Foundry Congress Attracts Foundrymen from 23 Nations	Nov.	106
International Foundry Congress Technical Reports	Dec.	125
Roll Foundry, Completes British	Feb.	108
Technical Session Papers of IBF Conference	Sept.	194
Dickinson, Thomas A.		
Aircraft Builder Operates Pattern Shop	Feb.	190
Ultrasonic Testing of Castings	Sept.	221
Dietert, Harry W.		
How Fast Should a Mold Be Poured?	Aug.	205
Dresselhuys, D. Jan and Erkkinen, [illegible]		
Accelerated Training Program Pays Off	Oct.	148
Dwyer, Pat		
Clamp Holds Crucible in Pouring Shank	Nov.	242
Adventures of Bill: Jan. 198; Feb. 218; Mar. 328; Apr. 206; May 290; June 250; July 234; Aug. 208; Sept. 245; Oct. 258; Nov. 250; Dec. 196		
Bronze Memorial To Honor U. S. Marine Corps	Oct.	104
Core Blowing Equipment and Use (ABC) (I)	Dec.	205
Follow Boards and Matchplates (ABC) Aug. 195; Sept. 255; Oct. 197; Nov. 287		
How To Bott Cupola Tap Hole	July	163

E

	Issue	Page
Elliott, H. E. and Leontis, T. E.		
Magnesium Castings	May	146
Erkkinen, Ahti and Dresselhuys D. Jan		
Accelerated Training Program Pays Off	Oct.	148

F

	Issue	Page
Faxon, William O.		
Back-up Material for Shell Molds	Nov.	178
Flinn, Richard A.		
Cast Metals and the University, Relationship between	Sept.	162
Fry, Eugene		
It's Harder To Be Safe in Jobbing Shop Operations	June	113
Quality Supervision in the Small Jobbing Foundry	Feb.	97

G

	Issue	Page
Genovese, Joe		
Cartoons: Jan. 258; Mar. 365; Apr. 265; June 154, 160, 162, 207; July 274; Nov. 218		
Goffart, J. F.		
European Foundry Progress-Belgium	Sept.	108
Gorsuch, G. H. and Kellner, M. J.		
Large Wood Patternmaking	Nov.	104
Grover, Albert E.		
Meeting Competition with Good Cost Methods (Part II)	Jan.	108
Gude, William G.		
National Foundry Association Discusses Management Problems	Nov.	154
High-Speed Molding Is Done Automatically	Apr.	99
Progress in Castings	May	116
Southeastern Foundry Conference, Holds AFS	Apr.	151
Southwest Regional Conference, Holds Third AFS	Jan.	261
Steel Founders' Society Holds Annual Fall Meeting	Nov.	180

H

	Issue	Page
Hall, John Howe		
Casting Light-Metal Alloys, Advances in	June	114

	Issue	Page
Heat Treatment of Steel Castings	Oct. 122; Nov. 124; Dec.	126
Shaking Out-Cleaning-Welding Steel Castings	Feb. 92; Mar. 194; Apr. 96; May	218
Halliday, W. M.		
Trouble-Shooting Die Casting Problems	Feb. 86; Mar.	196
Hecker, Jack E.		
Cartoons:	Jan. 274; Feb. 226,	247
Hefley, Brig. Gen. William T.		
Castings Play Important Part in Air Strength	Mar.	190
Heine, Prof. Richard and Barlow, Tom		
High Pressure Molding Studies	Aug.	146
Henderson, Harvey E. and Hulme, Philip		
Calcium Carbide Injection Is New Tool in Gray Iron Metallurgy	Apr.	86
Herrmann, Robert H.		
Buyers and Sellers Rate Each Other	Sept.	180
Canadian AFS Chapters Hold Foundry Conference	Jan.	132
Close Control Important in Making Intricate Aluminum Castings	Apr.	108
Conveyor Belting for Foundry Applications	Aug.	86
Conveyor Institute Covers Materials Handling	June	181
Double Lift Device Assures Pattern Draw Accuracy	Feb.	144
Grinds Skim Cores at High Production Rate	Sept.	168
How To Build Good Will with Neighbors and Employees	Aug.	111
Indianapolis Clears the Air	May	212
Materials Handling Conference, Holds	July	218
Mold Blower Provides High Production Rate	Nov.	190
New England Conference Covers Wide Range	Dec.	220
Pushbutton Foundry, Operates	Dec.	154
Quick Machine Mounting Devices for Wood Pattern Boards	Jan.	146
Hopkins, Curtis		
Cartoons:	Apr. 214; May 355; Sept. 174; Oct. 232; Nov. 210,	220
Hugo, Dr. E.		
European Foundry Progress-Germany	Sept.	114
Hulme, Philip and Henderson, Harvey E.		
Calcium Carbide Injection Is New Tool in Gray Iron Metallurgy	Apr.	86

J

Jenkins, Lyle and Steinhoff, H. E.		
Pearlitic Malleable Castings	July	84

K

Kellner, M. J. and Gorsuch, G. H.		
Large Wood Patternmaking	Nov.	104
Klinker, L. G.		
Copper Oxides—Useful Tools in Casting Copper-Base Alloys	Sept.	228
Kukla, A. J.		
Statistical Quality Control	Dec.	120

L

Lansing, James H.		
Malleable Iron Castings	May	140
LaVelle, Donald L.		
How To Avoid Trouble in the Aluminum Foundry	Dec.	102
Lee, Ralph L.		
Develops New Squeezer Type Machine	Jan.	171
Man-to-Man on the Molder's Bench: Jan. 148; Feb. 142; Mar. 274; Apr. 136; May 236; June 207; July 180; Aug. 165; Sept. 208; Oct. 166; Nov. 239; Dec. 168		
Leontis, T. E. and Elliott, H. E.		
Magnesium Castings	May	146
Lewis, Floyd A.		
Aluminum Castings	May	124
Longden, E.		
European Foundry Progress-Britain	Sept.	102

Mc

McCulloch, F. J.		
Making Cylindrical Cores without a Corebox	Oct.	152
Split Chill Is Easy To Remove From Wheel	July	170

M

Maganus, Paul G. and Reid, Vaughan C.		
Brass and Bronze Castings	May	136
Markowich, John J.		
Crucible Furnaces, Eliminates Plugged Burners and Air Lines on	June	210
Miske, Jack C. and Bremer, Edwin		
Ohio Regional Conference Offers Varied Program	Nov.	272
Miller, Leon F.		
Molding Machine Operates on Rotary Principle	Oct.	238
Mulcahy, Bernard P.		
Cupola Operation, Effect of Raw Materials on (Part 8)	Jan.	158
New Precision Investment Foundry	Jan.	86

O

Olivo, Mario		
European Foundry Progress-Italy	Sept.	110
Olson, Ray		
Laying Out a Shell Molding Foundry	June	108
Operhall, Ted		
Osborn, Alexander C.		
Crucible Handling Control, Device Gives	Apr.	200

P

Parsons, Richard W.		
Electric Annealing of White Iron	Nov.	112
Patterson, J. A.		
Gangway: Jan. 160; Apr. 144; June 167; Aug. 134; Sept. 164; Oct. 176; Nov. 248; Dec. 198		
Patterson, W. F.		
Apprenticeship in Patternmaking Industry	Oct.	210
Peterson, W. M.		
Coremaking Speeded by Heated Corebox	July	106
Zircon and its Foundry Applications	Apr.	92
Phillips, Arthur L.		
Casting Design Improved by Welding	Feb.	148
Pollock, Curtis		
Low-Frequency Induction Melting	July	108
Porter, Lew F. and Rosenthal, Philip C.		
Fluidity Test, Applications of Gray Iron	Aug.	94
Pridmore, Lawrence D.		
Core Wires and Rods, Ideas on	May	195
Double Lift Device Assures Pattern Draw Accuracy	Feb.	144
Molding Machine Frame Holds Pattern Boards	Aug.	199
Quick Machine Mounting Devices for Wood Pattern Boards	Jan.	146

R

Rapport, Ray		
Analysis of Tin in Copper-Base Alloys	Aug.	115
Reck, Franklin M.		
Sand in Their Shoes (Chapter 1)	Sept.	126
Reid, Vaughan C.		
Induction Melting in a Nonferrous Jobbing Foundry	Apr.	102
Reid, Vaughan C. and Maganus, Paul G.		
Brass and Bronze Castings	May	136
Roast, Harold J.		
Bronze Solidification, How Temperature and Pouring Rate Affect	Dec.	107
Choosing the Right Copper-Base Alloy	Oct.	114
Tin and Leaded-Tin Bronzes	July	94
Rosenthal, Philip C. and Porter, Lew F.		
Fluidity Test, Applications of Gray Iron	Aug.	94
Ross, Erle F.		
Automatic Control of Sand Moisture	Nov.	120
Cleaning Cast Steel Armor	Aug.	178
Purdue Metals Casting Conference, Holds 1952	Jan.	253
Purdue Metals Casting Conference, Holds 1953	Dec.	190
Ross, Erle F. and Steinebach, Frank G.		
Wisconsin Foundrymen Hold Conference	Apr.	196
Rostoker, W. and Berger, M. J.		
Effects of Vibration during Solidification	July	100
Russell, Clayton D.		
California Regional Conference, Holds	Apr.	167

S

Schlichter, Harry G.		
"Ideal" Steel Jobbing Foundry (Part II)	Jan.	102
Schmieder, John L.		
Use of Shell Cores in Casting Air-Cooled Engines	Dec.	114
Shumann, Frank E.		
Castings—A Material for Ammunition	July	88
Siebert, Walter		
What Is a Good Pattern?	Sept.	132
Smith, H. L.		
Machining on Castings, How To Eliminate Some	June	215
Smith, James H.		
Outstanding Opportunities for Foundry Industry	Aug.	100
Sobers, W. B.		
White Cast Iron, Porosity and Segregation in	June	128
Spies, F. W.		
European Foundry Progress—Netherlands	Sept.	112
Steinebach, Frank G.		
Army Engineers Operate Mobile Foundry	Dec.	112
FEMA Holds 35th Annual Meeting	Dec.	141
Foundry Facings Association Meets	Apr.	241
Malleable Founders' Society Discusses Safety	Mar.	222
Malleable Founders' Society Holds Annual Meeting	Aug.	130
Malleable Founders' Society Holds Fall Industry Meeting	Nov.	163
Market Development Conference, Malleable Founders Hold	June	178
Nonferrous Founders' Society Holds Annual Meeting	June	202
Steel Founders' Society Holds 51st Annual Meeting	May	253
Steinebach, Frank G. and Ross, Erle F.		
Wisconsin Foundrymen Hold Conference	Apr.	196
Steinhoff, H. E. and Jenkins, Lyle		
Pearlitic Malleable Castings	July	84

T

Tharp, William G.		
Cartoons: July 224, 245; Aug. 252; Oct. 214; Dec. 164, 192		
Tindula, Roy W.		
Mold Design for Steel Casting	Oct.	242
Trevithick, T. H.		
Patterns—Their Relation to Castings Production (ABC) Part III	Jan. 191; Feb. 195; Mar. 293; Apr. 217; May	243

V

Vincent, E. T.		
Casting Design for Heavily Loaded Parts	Jan.	94

W

Wagner, H. W.		
Snagging Operations	Jan.	112
Walton, Charles F.		
Principles of Risering, The	Feb.	100
Wolf, John E.		
Coreroom Handles Jobbing Work Efficiently, New	June	118
Wolfe, James W.		
Nonferrous Founders' Society Completes 10 Years	Apr.	114
Wood, Robert T.		
Grain Refinement of Magnesium Castings	Feb.	98
Workman, Donald H.		
Gray Iron Founders' Society, Quarter Century of Progress Marked by	Oct.	126

Z

Zabriskie, Clinton F.		
Surface Porosity in Silicon Aluminum Castings	Feb.	112